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DIAGNOSTICS
OF
THE FUNDUS OCULI

BY

EDWARD L. OATMAN, M. D.

VOLUME III

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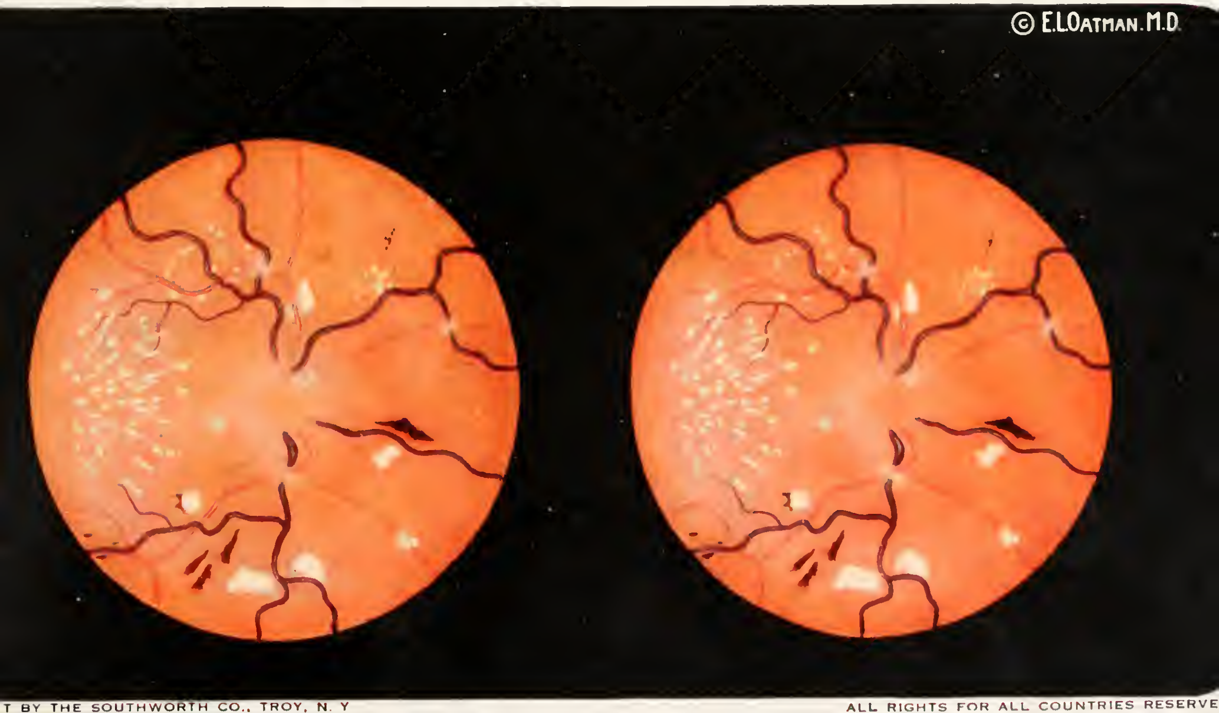
NOTE.—Examples of Optic Neuritis are shown in Stereograms 31, 35, 36, 65 and 66.

ANGIOPATHIC ALBUMINURIC RETINITIS

DEGENERATIVE STAGE

RIGHT eyeground of a man, 42 years of age, with advanced interstitial nephritis. The retina is passing from the exudative to the degenerative stage of retinitis. There is a severe neuritis which increases the tortuosity of the veins and retinal edema. The different stages of albuminuric retinitis seldom are sharply differentiated: for example, in this fundus the retinal edema, hemorrhages and fluffy exudates belong to the exudative stage, but the stellate figure about the macula and large white patches suffice to place the case in the degenerative stage. The edema is most conspicuous about the nerve. The outlines of the disc are obscured and the nerve head appears as a muddy-red blur. The engorged and tortuous veins burrow into the swollen retina about the nerve and disappear. The arteries are narrowed. The hemorrhages are striate, indicating their position in the nerve-fiber layer. The large whitish plaques are superficially situated, well defined and nonpigmented. The spots cover an artery when the two are in contact. The "star" does not completely encircle the macula; its rays consist of short, linear and rounded whitish spots arranged in rows. Small, fluffy, edematous spots are seen where two vessels cross. A group of small dots is seen in the region of the superior temporal vessels.

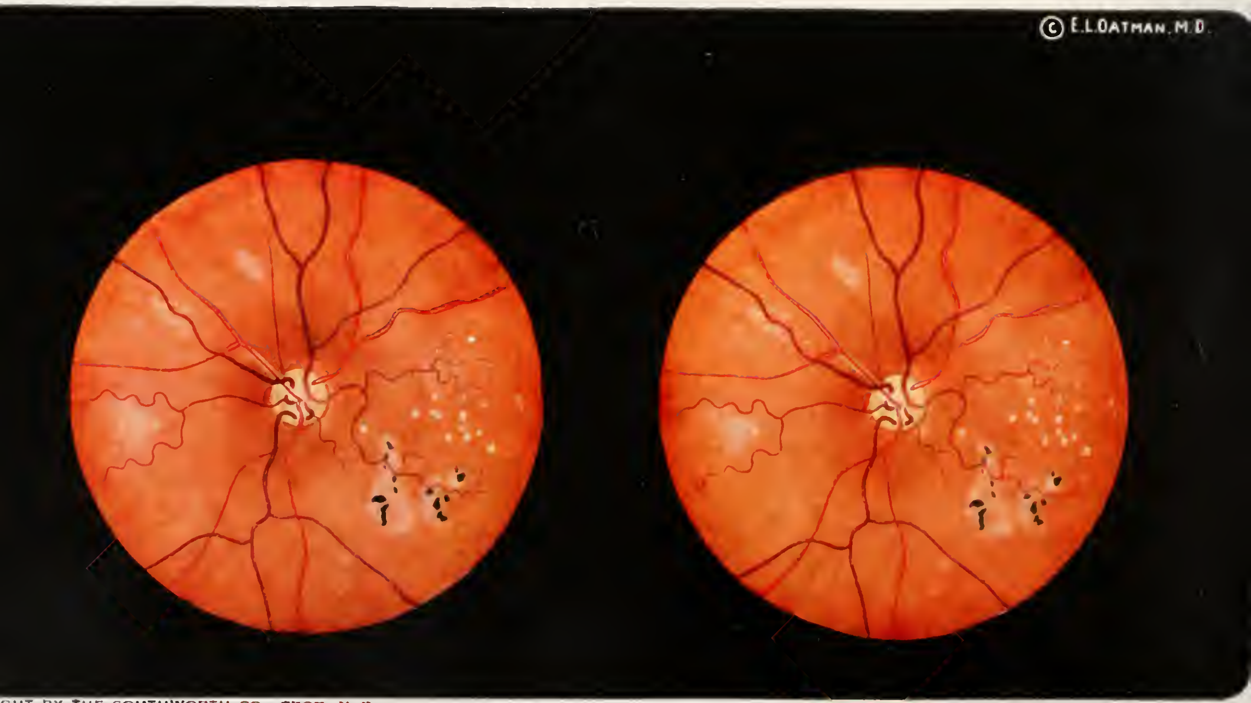


ANGIOPATHIC ALBUMINURIC RETINITIS

ATROPHIC STAGE

LEFT eyeground of a woman, 39 years of age, with advanced cirrhosis of the kidneys. Ophthalmoscope reveals angiopathic retinitis in the atrophic stage, in both eyes. The optic nerve presents the yellowish-white color of retinitic atrophy. The fundus, especially on the nasal side, contains several dirty-grey patches which are interpreted as retinal cicatrices that have replaced the white plaques of the degenerative stage. The few white spots around the macula are probably the remains of a "macular star." All the blood vessels are in an advanced stage of degeneration. The pigment which is grouped along the course of a macular vessel is supposed to be of hematogenous origin.

Diagnosis: The thin patches of atrophic retinitis could hardly be mistaken for the deep, pigmented lesions of choroiditis (stergm. 20). Other forms of retinal atrophy, *i. e.*, retinitis pigmentosa (stergm. 53), punctata albescens (stergm. 54), occlusion atrophy (stergm. 44), etc., present characteristic fundus changes. Moreover, in all these diseases the retinal vessels undergo uniform narrowing and obliteration, while in the atrophy of angiopathic retinitis the vessels present the varied degenerative changes of arteriosclerosis.



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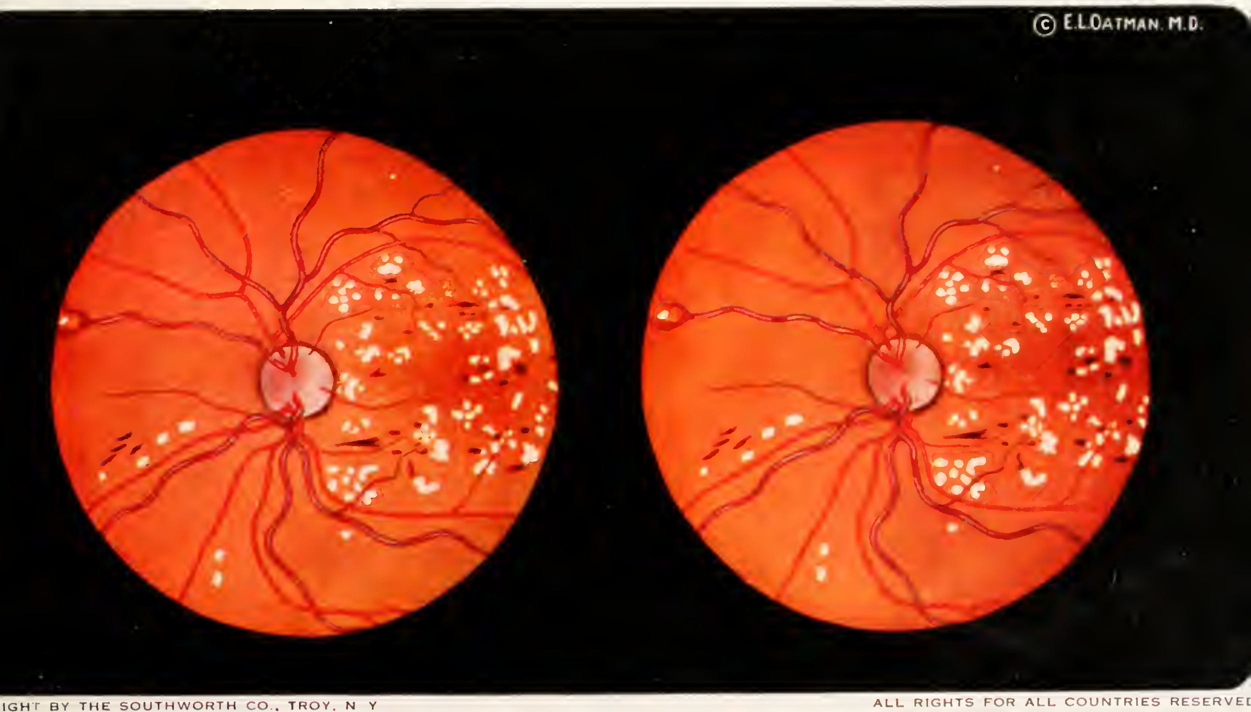
DIABETIC RETINITIS

LEFT eyeground of a laborer, 52 years of age. His vision first began to fail seven months ago and now is 20/200 in each eye. The urine contains sugar, 3 per cent; no albumin, no casts and no acetone. Examination of the feces shows marked pancreatic insufficiency. The fundus changes are symmetrical in each eye. The ophthalmoscopic picture is a remarkable example of Hirschberg's central, punctate diabetic retinitis. The optic disc is normal and the retinal vessels are not visibly sclerosed. The region embraced by the upper and lower temporal vessels is covered by groups of superficially situated, small, white, discrete, sharply defined spots, many of which possess an elongated shape. Scattered between the spots are numerous small striate hemorrhages. A few isolated spots are situated on the nasal side of the nerve.

The patient was kept in the hospital ward for several weeks, during which time no improvement occurred.

Diagnosis: This picture, which is extremely rare, probably is characteristic of diabetes, although the several types of angiopathic retinitis are differentiated by physical examination rather than by the ophthalmoscope. The angiopathic character of this retinitis is indicated by the hemorrhages. It differs in appearance from albuminuric retinitis in the absence of neuritis, visible vascular changes and retinal edema.

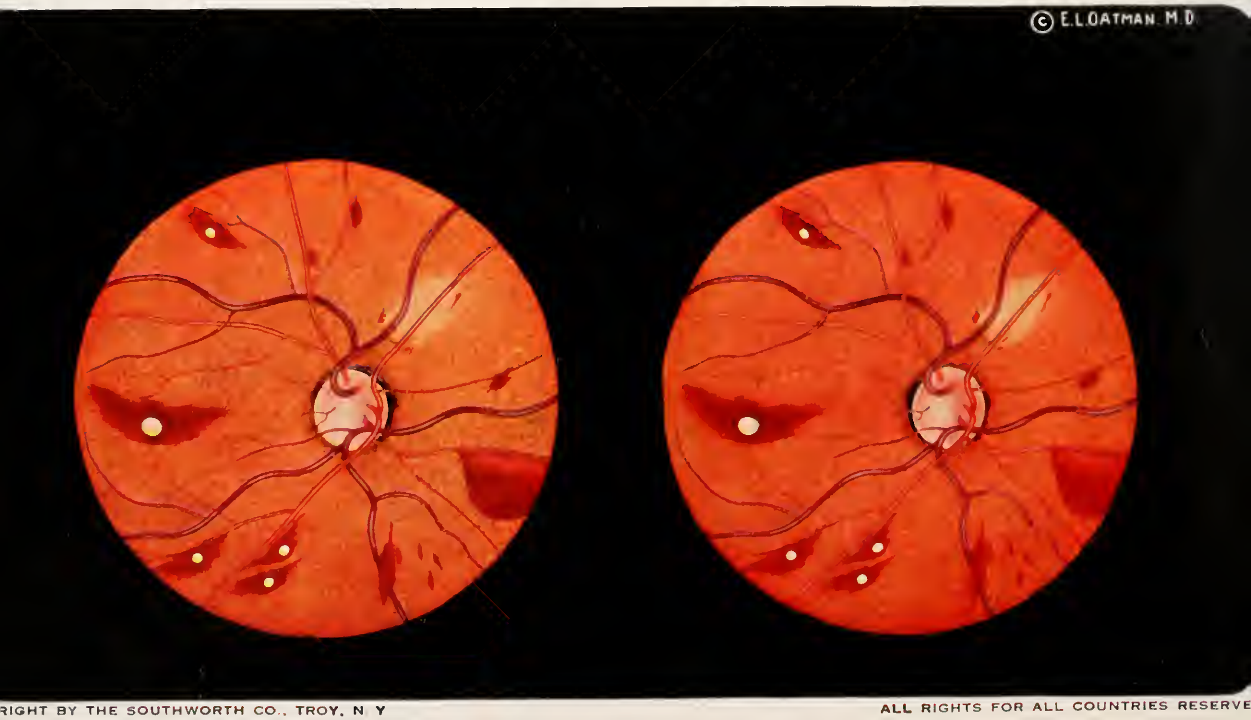


LEUKEMIC HEMORRHAGIC RETINITIS

RIGHT fundus oculi of a man, 32 years of age. Syrian. Entered the clinic complaining only of a slight conjunctivitis. He was intensely anemic. Blood examination demonstrated the presence of lymphatic leukemia. Urine normal. Vision 20/20. With the ophthalmoscope, numerous characteristic white-centered hemorrhages along the arteries and veins, were found in both eyes. Three days after coming under observation, central vision in the right eye was suddenly lost during an attack of sneezing. I saw him five hours after this accident and found a large fresh hemorrhage covering the macula. This new extravasation contained a round, sharply defined, brilliantly white center. The stereogram presents the ophthalmoscopic picture seen at this time. Although the patient has a very dark complexion, the fundus possesses a light yellowish cast and the surface appears granular. This appearance is attributed to an orange colored choroid shining through deeply pigmented retinal epithelium. The optic disc has a uniform pink color, but there is no evidence of neuritis. The axial light streak on the arteries is unduly broad and bright. The veins are rather full. The entire fundus contains numerous striate hemorrhages, several of which contain a round, white, central spot. Immediately below an artery, on the nasal side, is a large preretinal hemorrhage. Beneath the supranasal vessels is a yellowish patch, about equaling the area of the optic disc, which marks the site of an ancient hemorrhage.

The patient returned to Syria where he died from leukemia about one year later.

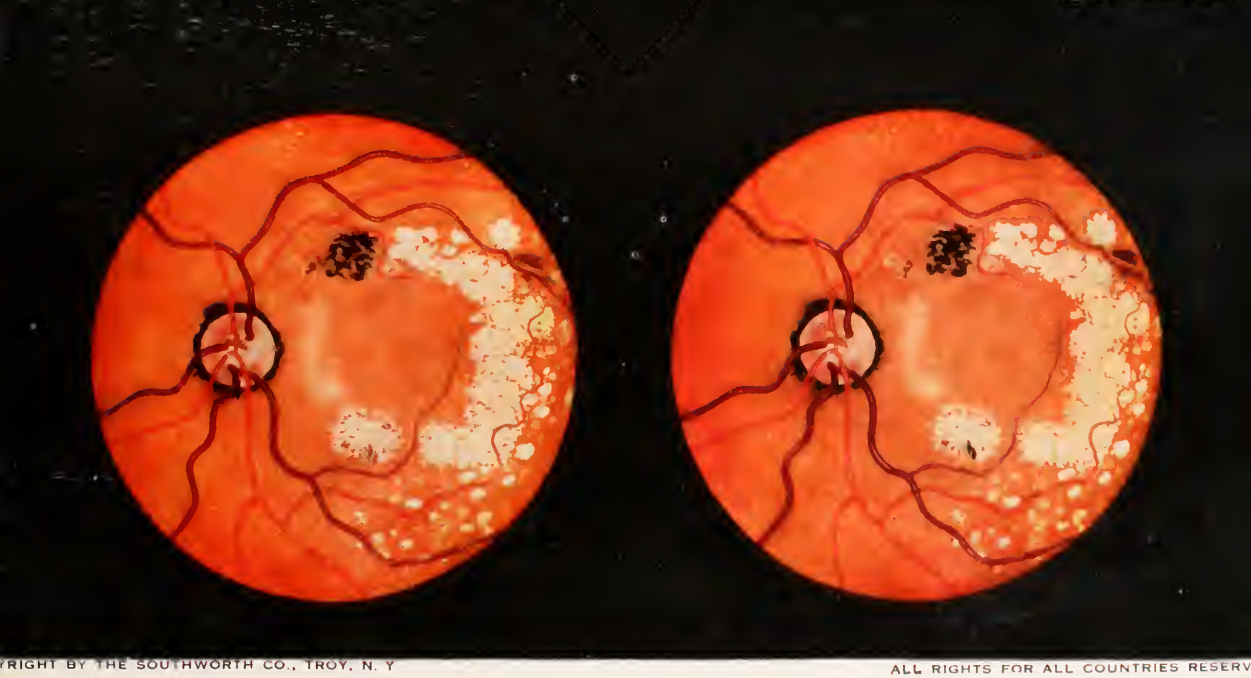
Diagnosis: Leukemic retinitis is ophthalmoscopically recognizable only when fresh hemorrhages contain the characteristic white centers. Inasmuch as similar white-centered hemorrhages are said to occur in pernicious anemia, the nature of the underlying disease must be determined by an examination of the blood.



RETINITIS CIRCINATA

RIGHT eyeground of a woman, 60 years of age. In her first confinement, 31 years ago, she developed puerperal eclampsia. Eight subsequent confinements were normal and all children born are still living and healthy. Urine, normal. Blood pressure 180 to 190 mm. Hg. Vision of the right eye has been progressively failing for the past year. Aside from slight vascular changes in the retina, the left eye appears normal. In the fundus of the right eye is an open, white girdle around the macular region. The radius of the girdle fills the space between the superior and inferior temporal vessels. The gap in this circle occurs on the side nearest the nerve, and is filled by a yellowish-white strip resembling an infiltration of the retina. The girdle is composed of large and small, closely packed, white spots. The surface of the larger spots is stippled. The large, white areas are bordered by numerous small, round, white and grey dots which tend to coalesce. Below, in the radius of the white circle, is a mass of branching pigment, lying upon a patch of discolored retina. Within the girdle the entire retina is opaque. The optic disc contains a deep physiologic excavation and appears normal. The retinal arteries present bright central light streaks. The terminal of the superior temporal artery runs in front of the white girdle and, in this part of its course, is dilated and tortuous. The retinal veins are slightly dilated. Two striate hemorrhages are seen along the course of the inferior temporal vein, immediately outside the girdle.

Diagnosis: It is not difficult to diagnosticate retinitis circinata if attention is once directed to the characteristic arrangement of the white spots. In retinitis circinata white spots never appear in the macula, but in albuminuric and diabetic retinitis the macular region is the favorite site of exudation.



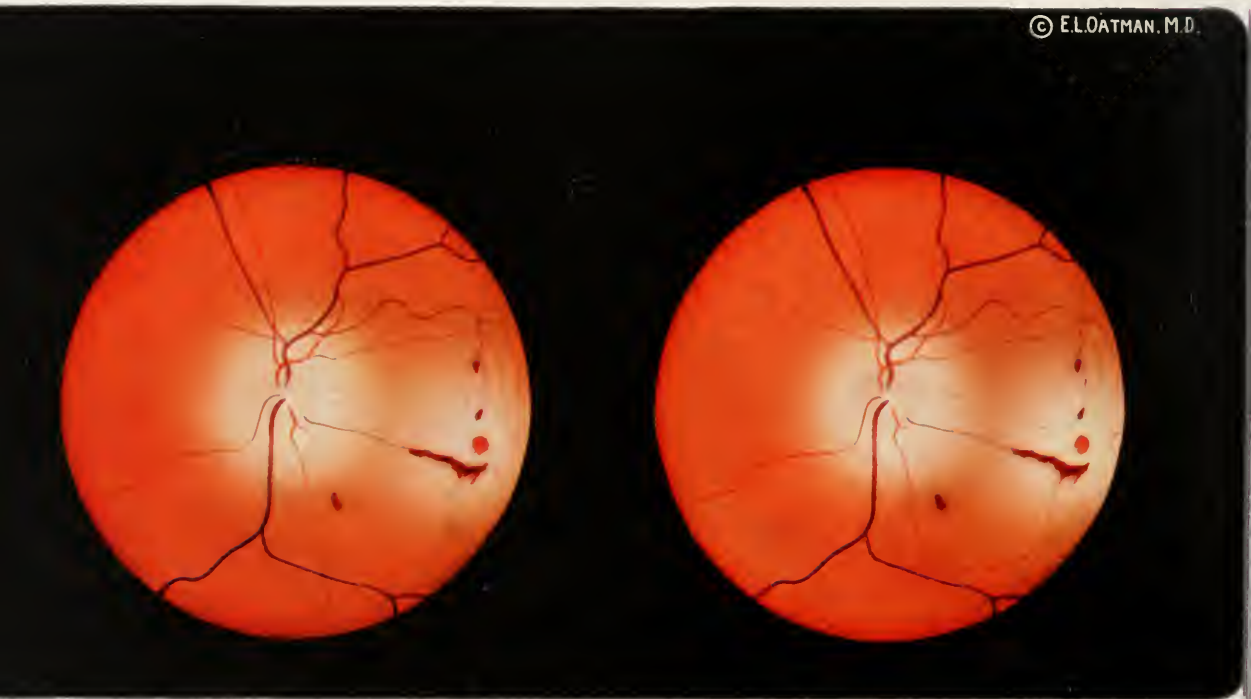
CLOSURE OF CENTRAL RETINAL ARTERY

LEFT fundus oculi of a girl 18 years of age; telephone operator. The left eye has been subject to transitory obscurations of vision. Suddenly, while working, she suffered from slight vertigo and the left eye became blind, but on this occasion vision did not return. The eye was without light perception then or afterward. Urine normal; blood pressure 125 mm. Hg.; no syphilis; no tuberculosis. An aortic systolic murmur was heard by some and not by others.

The stereogram was painted seven days after closure. The pale optic disc is surrounded and obscured by a broad halo of opaque retina. The retina is opaque also in the macular region, strongly contrasting with the "cherry-red" fovea. The larger arteries are filiform and the smaller branches invisible. A few small hemorrhages have occurred around the macula and nerve. The veins are better filled than the arteries. The supranasal vein is broader at the periphery than at the center. Slight pressure on the eyeball produces pulsation in the vessels, proving that circulation is partly re-established.

Two years later the retina was highly atrophic (stergm. 44). Physical examination at this time failed to reveal any cause for closure of the artery.

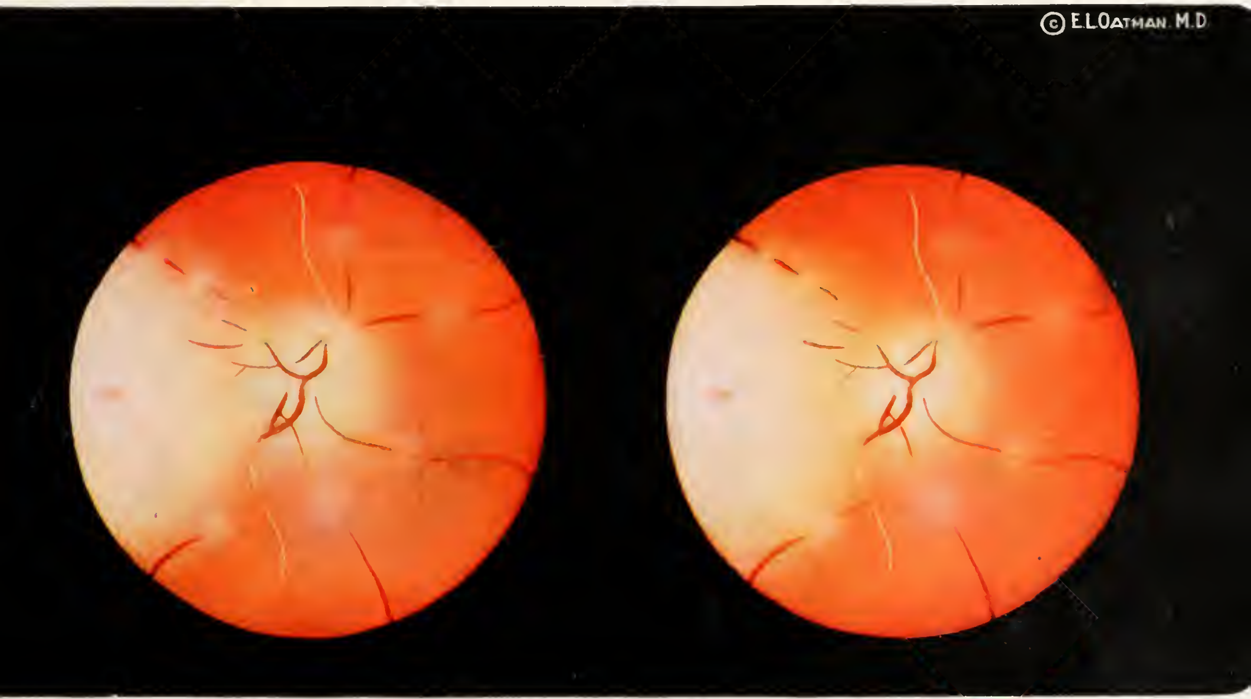
Diagnosis: The ophthalmoscopic picture of central artery closure is characteristic. In amaurotic idiocy (stergm. 57) the fovea appears as a red spot surrounded by a zone of opaque retina. This disease, however, occurs only in infants and is attended by general paresis. A somewhat similar picture may follow contusion of the retina (stergm. 59), but here the retinal vessels are full or distended; while in arterial closure they are nearly or completely empty. (See also stereogram 42).



CLOSURE OF CENTRAL RETINAL ARTERY

RIGHT fundus oculi of a woman, 37 years of age. Urine normal; no trace of syphilis; heart slightly dilated but no murmurs. Two weeks ago she suddenly became blind in right eye, since which time there has been no perception of light. The subsequent history of the case is unknown. Ophthalmoscopic examination revealed the picture of recent central artery closure. The retina is unusually opaque throughout the entire posterior zone of the fundus. Around the nerve and at the macula the opacity is very dense, completely obscuring the disc, while the cherry spot at the macula is indistinct. That this retina is edematous as well as opaque is indicated by the denseness of the opacities which overlie the vessels. Arteries are indistinguishable from veins. Most of the vessels taper from the periphery toward the disc. An ascending and a descending vessel appear as white lines without visible blood columns, showing that the walls are sclerosed.

Diagnosis: Sudden, complete and painless loss of vision always suggests closure of the central artery In this eye retinal opacity is unusually extensive. Its uniform distribution around the nerve and macula is characteristic of closure. A somewhat similar appearance may exist in commotio retinæ (stergm. 59). In the latter condition the blood vessels are of normal size or dilated, while in arterial closure they usually are diminished in size and taper from the periphery toward the disc. Diagnosis of central artery closure is continued in stereogram 43.

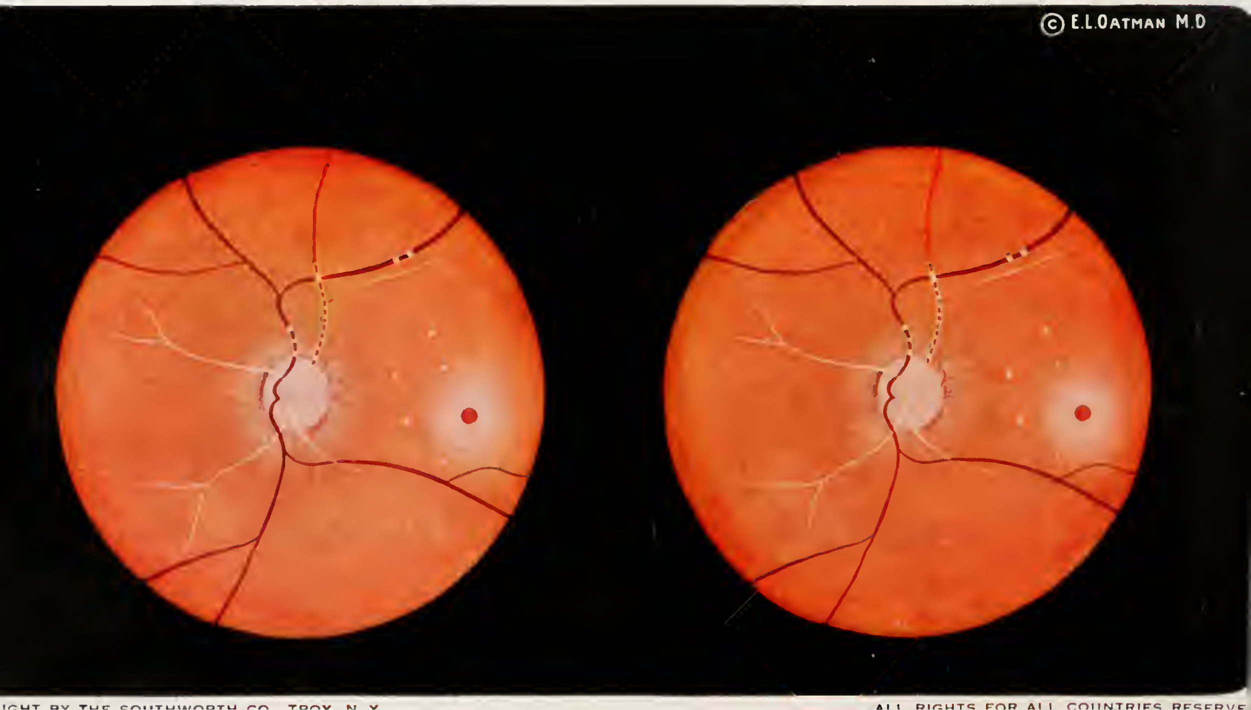


CLOSURE OF CENTRAL RETINAL ARTERY

VISIBLE COLLATERAL CIRCULATION AND GRANULAR BLOOD CURRENT

LEFT eyeground of a woman, 47 years of age, with chronic interstitial nephritis. The right eye presents a typical ophthalmoscopic picture of angiopathic albuminuric retinitis. She has had occasional, transitory obscurations of vision in the left eye. Five hours before coming under observation this eye became suddenly blind. Vision was reduced to perception of light. The ophthalmoscopic appearance was characteristic of recent occlusion of the central artery. A typical foveal spot is present surrounded by a limited area of opaque retina. The disc is well outlined but enclosed by extremely delicate radii, evidently an early stage of opacity. Elsewhere, the retina has a gray, lifeless appearance. A few prominent, white dots, scattered about the macular region, are regarded as products of retinal degeneration due to nephritis. The visible arteries are highly sclerosed and appear as white cords, with the exception of the supratemporal branch, which contains a sluggish granular current. The corresponding vein also exhibits a granular current, but less broken than the artery. All veins appear to diminish in size as they approach the disc. The blood circulating in the supratemporal artery is supplied by a plexus of small vessels, situated on and around the disc.

DIAGNOSIS: The bloodless retina and "cherry red" macula are diagnostic of central artery closure. The granular current also is seen only when the vessel is insufficiently supplied with blood.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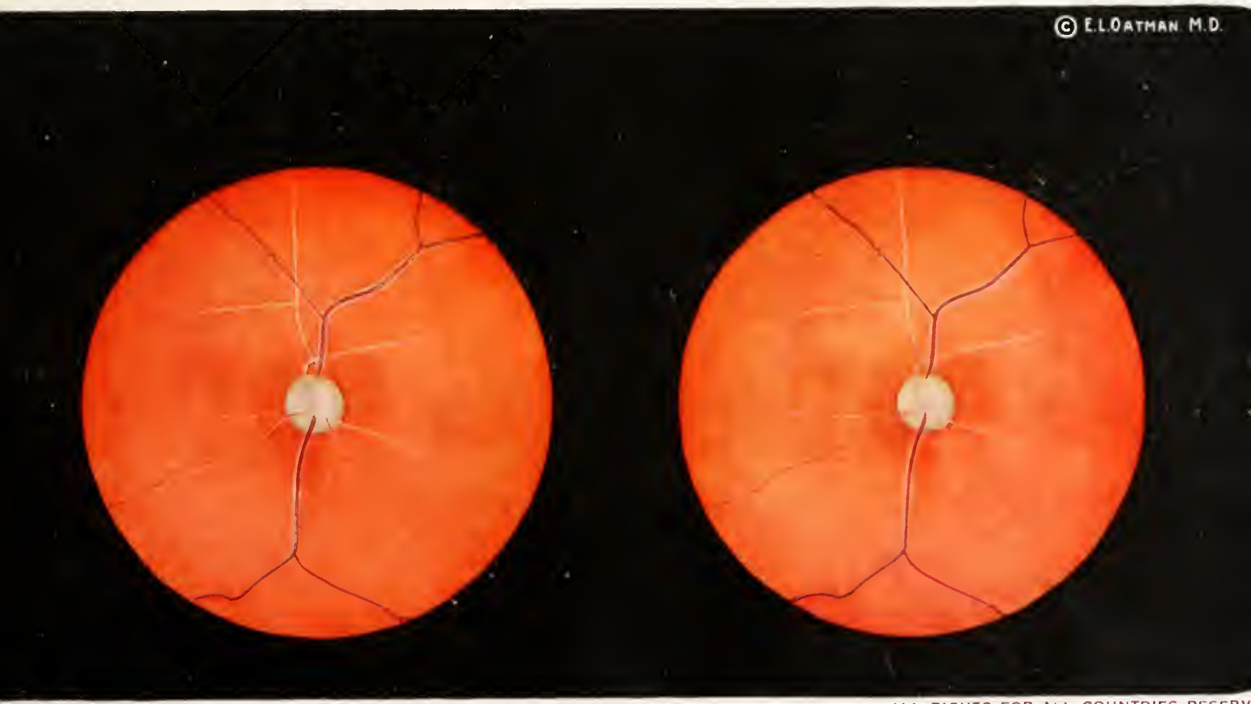
OCCLUSION ATROPHY

Retinal Atrophy Following Closure of the Central Artery

LEFT fundus oculi of a girl, who two years ago suffered from complete closure of the central artery of the retina. The ophthalmoscopic picture which the eye presented at that time is shown in stereogram 41. Vision was not restored after closure occurred. Externally, the eye appears normal. Light perception is absolutely abolished. Direct pupillary reaction to light is lost, but consensual reaction is normal. The fundus picture is characteristic of atrophy confined to the inner layers of the retina. There is no pigmentation or other evidence that either the outer layers of the retina or the choroid are disturbed. The atrophic nerve has a yellowish cast and the markings of the lamina cribrosa are invisible, indicating that the optic atrophy is of retinal origin. Only two arteries contain blood columns, the others being reduced to white bloodless cords or entirely obliterated. Those veins which remain are highly sclerosed, but contain more blood than the arteries. A delicate veil, representing the atrophic layers of the retina, hangs over the entire fundus.

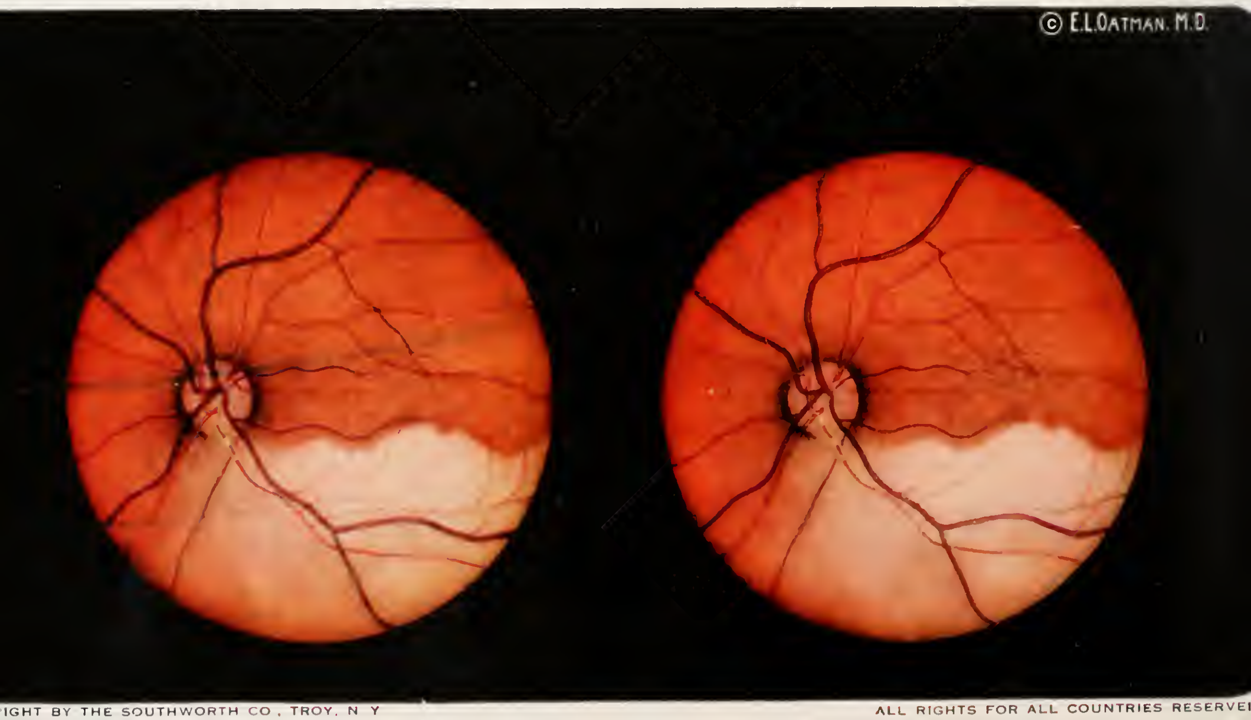
Diagnosis: Occlusion retinal atrophy is recognized by its extreme character, absence of postinflammatory products, pigmentation or hemorrhage and by absolute blindness. Thus, the postretinitic atrophy of albuminuric retinitis is attended by variegated vascular changes and the scars of an exudative process (stergm. 37). The retinal atrophy of retinitis pigmentosa (stergm. 53) and of retinitis punctata albescens (stergm. 54) is accompanied by the characteristic retinal degenerations.



CLOSURE OF CENTRAL RETINAL BRANCH

Married woman, 30 years of age. Mother of two healthy children. Has never miscarried. Wassermann test for syphilis and von Pirquet for tuberculosis, negative. Urine contains a trace of albumin. Blood pressure 125 mm. Hg. Physical examination failed to reveal either cardiac or vascular disease. Four days ago sudden blurring occurred in the left eye. Light perception is lost in the upper-inner visual field. With the ophthalmoscope a retinal opacity is seen covering the infratemporal quadrant of the fundus, most dense in the macular region. On the temporal side the opaque and normal retina are sharply separated by a wavy line which passes directly through the fovea centralis. On the infranasal side, the white opacity fades gradually into the normal red fundus. The opaque region is triangular in form with the apex at the disc. The lower half of the fovea centralis is situated within the opacity and appears as a semicircular, red spot. The affected region of the retina represents the area of distribution of the infratemporal retinal artery which is obstructed at the disc. At its exit from the nerve, this vessel is opaque for a distance of about one disc diameter. Within the opaque portion of the artery are two short red segments of blood column which probably represent transparent areas in the walls of the artery.

Diagnosis: Closure of a branch artery may be mistaken for flat retinal detachment (stergms. 50–52) or for edema due to effusion from the choroid (stergm. 18).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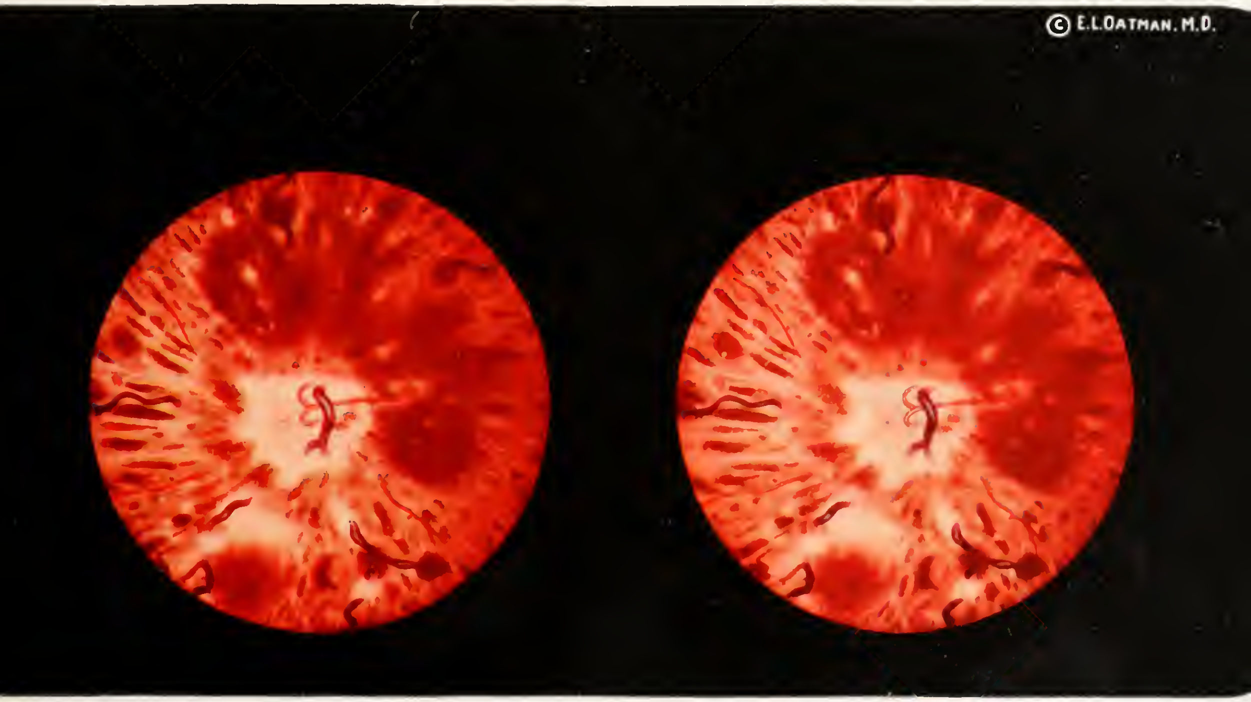
CLOSURE OF CENTRAL RETINAL VEIN

Synonyms: Retinal Thrombosis; Retinitis Hemorrhagica; Apoplexy of the Retina

MULATTO woman, aged 45 years. Laundress. Urine normal. Blood pressure, 250 mm. Hg. Surface arteries rigid. Numbness of left hand and leg. Five weeks ago, on waking in the morning, she discovered that her left eye was blind. At the present time, she can recognize movements of the hand. The ophthalmoscope shows the entire fundus covered with blood. Most of the hemorrhages are striate but many are deep and round. An almost continuous sheet of blood extends around the upper and temporal sides of the disc. The nerve-head is not swollen, but is covered and obscured by a patch of white exudate. Similar exudative masses are scattered throughout the fundus. The enormously dilated and tortuous veins are either entirely buried in the swollen retina, or rise above the surface in dark venous loops. The arteries are also obscured by the swelling and hemorrhage, but wherever visible they do not appear narrowed. The veins cannot be emptied of blood by external pressure on the eye.

Diagnosis: Only the condition known as thrombosis of the central vein of the retina produces the picture shown by this stereogram. From choked disc it is differentiated by the extensive bleeding and absence of nerve swelling. Hemorrhage from traumatism would be more local or, if extensive, blood would appear in the vitreous. That the venous obstruction in the above case is complete is shown by the amount of blood extravasated and by inability to empty the veins on the disc by external pressure with the finger.



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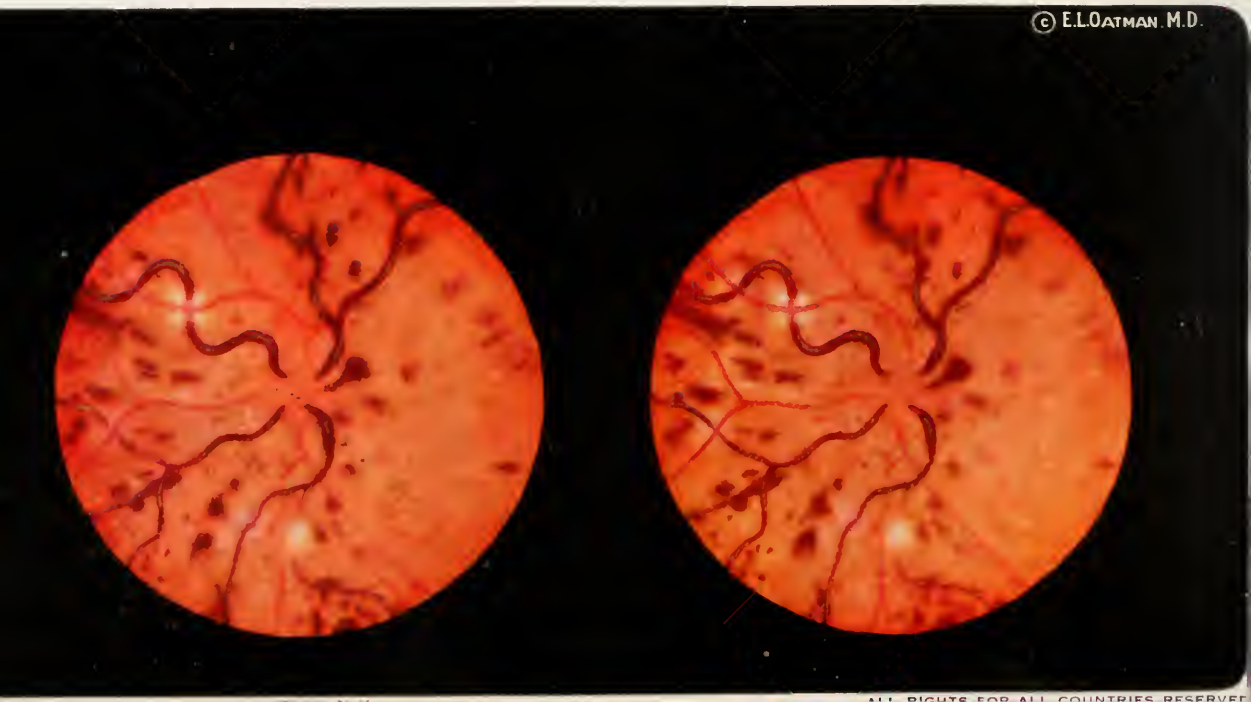
CLOSURE OF CENTRAL VEIN WITH NEURITIS

SYNONYM: HEMORRHAGIC NEURORETINITIS

UNMARRIED woman, 28 years of age. Menses commonly delayed three or four months. Right eye normal. Left eye, vision 20/200. Aside from menstrual disorder nothing abnormal could be discovered by the most exhaustive examinations.

Ophthalmoscopic Examination. The optic disc is edematous and slightly swollen. The height of the swelling does not exceed two dioptres (.66 mm.). The entire retina is edematous and covered with scattered, striate and round hemorrhages. The veins are dilated and tortuous, especially the ascending branches. The arteries are somewhat obscured by retinal edema but otherwise appear normal. Pressure on the eye empties all veins on the disc with the exception of the ascending temporal. The appearance of the veins on the disc after recovery, indicated that the obstructive pathologic process was anterior to the lamina cribrosa and, probably, involved the temporal veins after they emerged from the nerve. This situation of the obstruction (phlebitis or thrombus) may have caused the nerve to swell. The hemorrhages were gradually absorbed and vision was restored to 20/30 where it has remained for the past eight years. The appearance of this fundus after recovery is shown in stereogram 49.

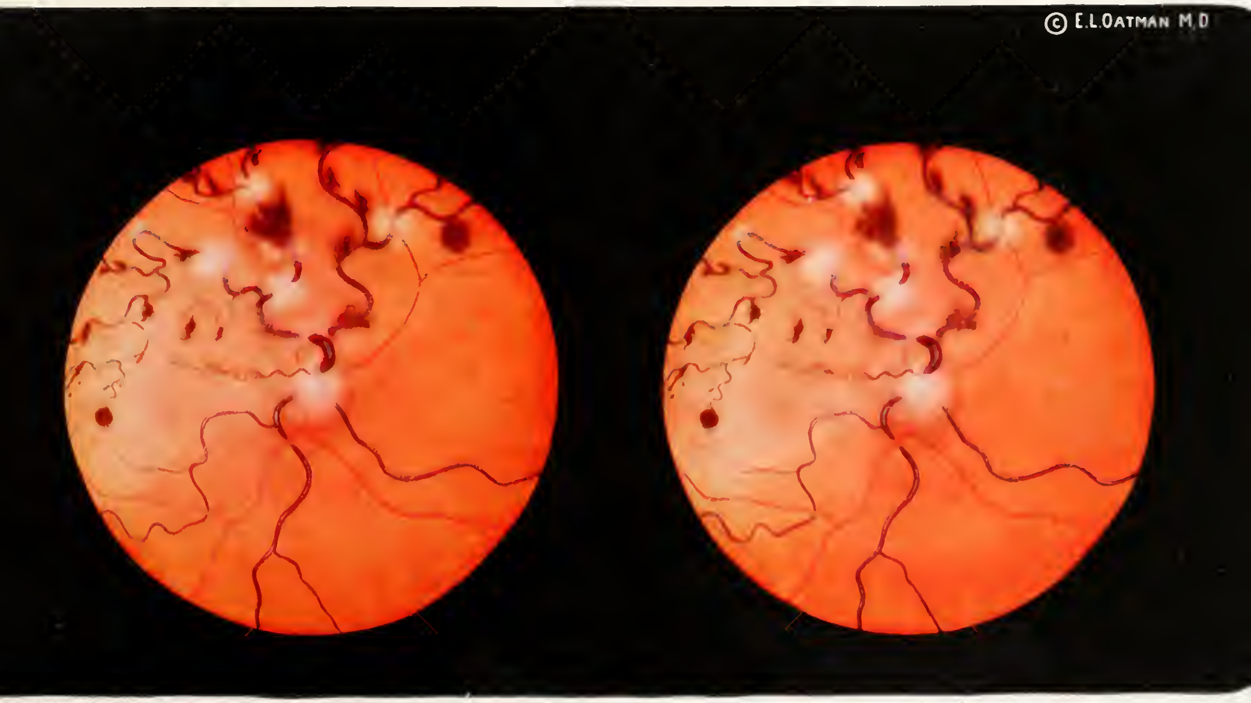
DIAGNOSIS: In this case the nerve is swollen, but not enough to produce hemorrhages; here, the amount of bleeding and retinal edema are greater than would occur from any obstruction due to mere swelling of the nerve. Pressure on the eye empties the veins, indicating an incomplete closure of the central vein of the retina, *i. e.*, a thrombus of the second class.



CLOSURE OF SUPERIOR RETINAL VEIN

RIGHT eyeground of a laborer, aged 49 years. Blood pressure 195 mm. Hg. Has chronic interstitial nephritis. Five days ago vision rapidly failed in this eye and now is 20/70. The ascending subdivision of the central vein and its branches are dilated, tortuous and surrounded by hemorrhages, appearances which characterize closure of the vessel. The retina is edematous, particularly along the veins where they make quick bends. Both superficial and deep hemorrhages have occurred. A small, round extravasation, situated near the macula, was at first mistaken for a red fovea. This error was corrected by having the patient gaze into the aperture of the ophthalmoscope, when the point of fixation (fovea) was found to be much nearer to the disc than the round hemorrhage. The veins not included in the obstruction are somewhat tortuous. This is attributed to retinal arteriosclerosis which is further demonstrated by the descending artery which indents and hides a vein over which it crosses. The mild neuritis may be due to the associated albuminuria or to the situation of the thrombus on the disc.

Diagnosis: In this case the diagnosis of venous branch closure rests upon the presence of hemorrhage, exudation, tortuous veins, comparatively unaltered arteries and retinal edema limited to the region drained by the venous branch. Optic neuritis (stergms. 65–66) is excluded on the ground that so much edema and hemorrhage could not be caused by moderate swelling of the nerve, and also by the limited area of retina affected.

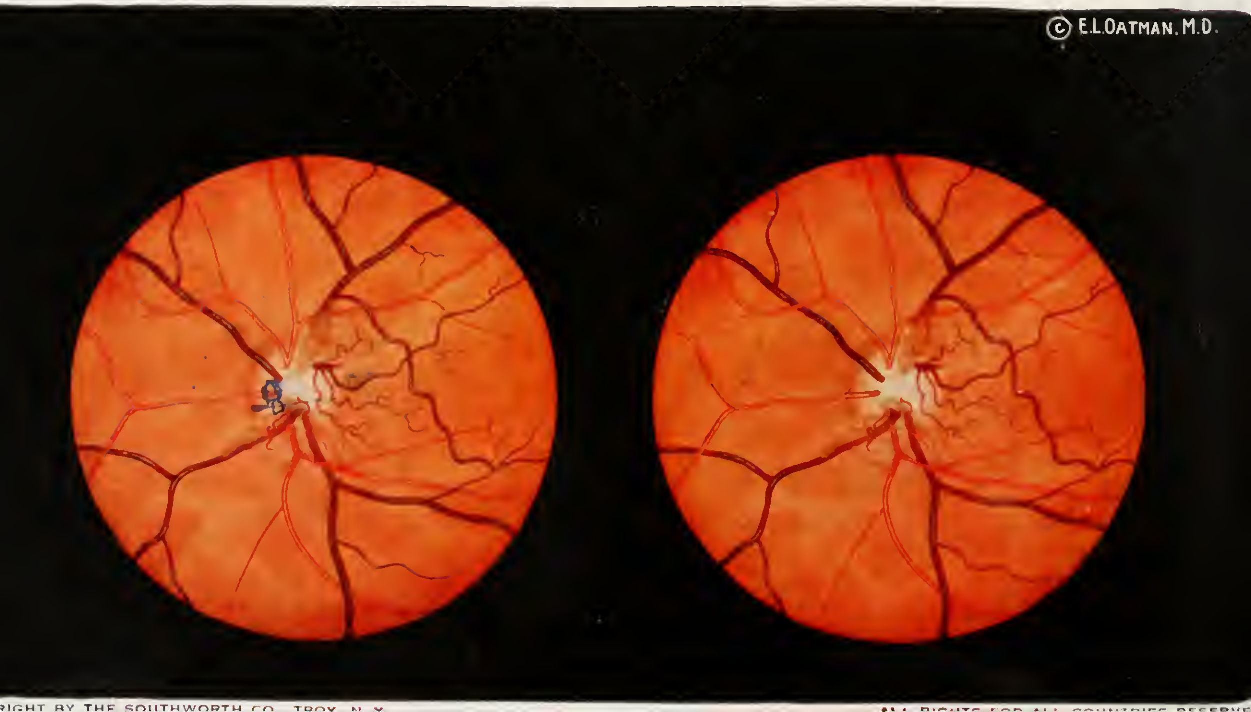


POST-THROMBOTIC CHANGES

NEW-FORMED VEINS AND MEMBRANES

LEFT eyeground of a woman, 30 years of age. Two years ago the central vein in this eye was closed as shown in stereogram 47. Vision is now restored and equals 20/30. There is a physiologic excavation of the disc, filled with new-formed connective tissue which extends beyond the nerve in the form of membranes around the retinal vessels. The membrane which follows the descending vessels is diaphanous and vascular, while the ascending vein is enwrapped by a thick, membranous formation which thickens the vessel without interfering with its circulation. The superior temporal vein is obliterated beyond the edge of the disc. Stereogram 47 shows that, in the early period of closure, this vessel appeared to terminate in a deep hemorrhage. The macular region to which this vein was once distributed, is now drained by a large number of newly developed vessels connected with the stump of the obliterated vein. The macular region is further vascularized by an encircling branch from the ascending vein.

Diagnosis: It may be assumed that new-formed membranes and vessels in the retina have been preceded by hemorrhage. This case might well be regarded as one of retinitis proliferans (stergm. 61), except that the new vessels are known to be collaterals which have reëstablished circulation in an obstructed vein.



INCIPIENT DETACHMENT OF THE RETINA

FLAT DETACHMENT

LEFT eyeground of a man, 35 years of age. Two weeks ago he received a stiff blow over the left eye. Ten days later photopsiæ appeared in the form of fiery sparks and flashes. Vision is low and objects appear distorted. The eye is myopic 6.5 D. The optic disc is uniformly reddened and on its temporal side is a narrow, myopic crescent. All parts of the fundus present a red reflex. In the upper temporal quadrant, the retina is covered by a number of delicate, parallel lines which disappear on changing the position of the eye and, evidently, are due to light reflected from surface inequalities. In this region the retinal vessels are darkened and contain no central light streaks. They also are wavy as though following wrinkles in the retina. It cannot be determined with the ophthalmoscope that the surface is elevated. In the lower part of the fundus the vessels are straightened and drawn toward the temporal side as is common in myopia.

DIAGNOSIS: In flat detachment, if the subretinal fluid is clear, the normal red fundus reflex may not be appreciably changed. In such cases the diagnosis may be established by the presence of some or all the following symptoms:

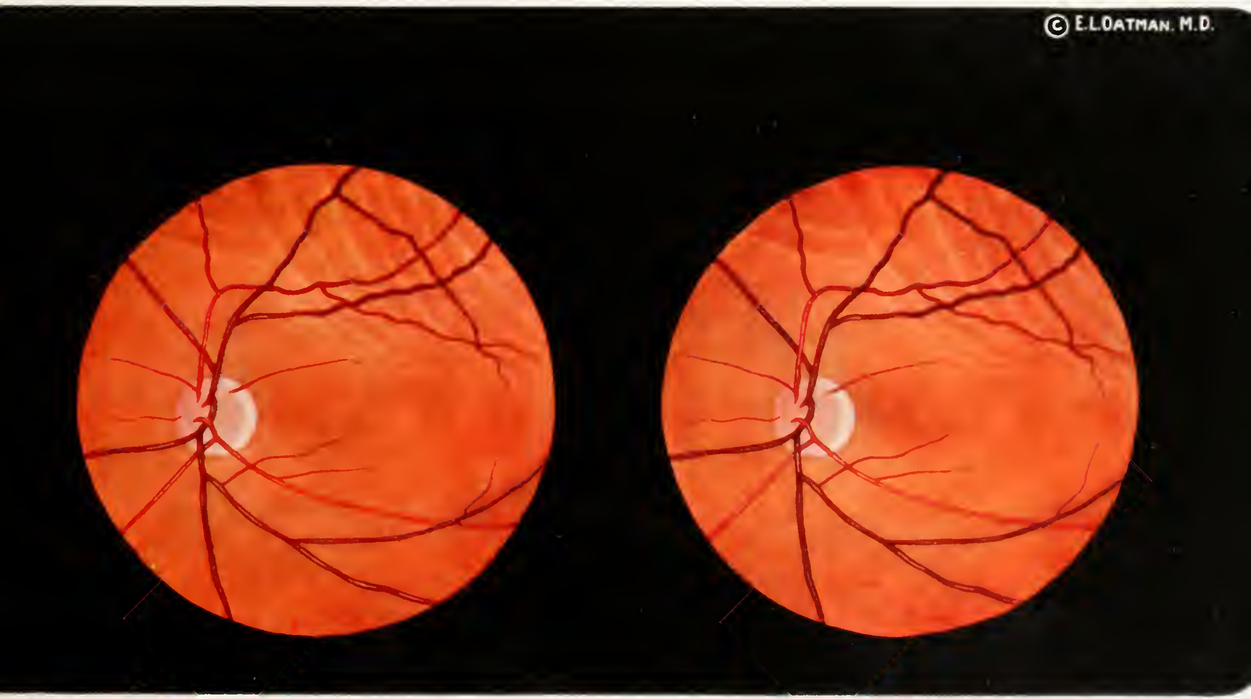
(a) Functional disturbance consisting of lowered visual acuity, torpor retinæ, metamorphopsiæ, photopsiæ, chromotopsiæ, etc.;

(b) Congestion and darkening of the vessels with loss of central light streak and, sometimes, irregularities in their course;

(c) Local hypermetropia, demonstrable by the ophthalmoscope;

(d) When underlying choroidal vessels are distinguishable, a parallactic motion between them and the retinal vessels may be obtained, indicating an abnormal difference in levels;

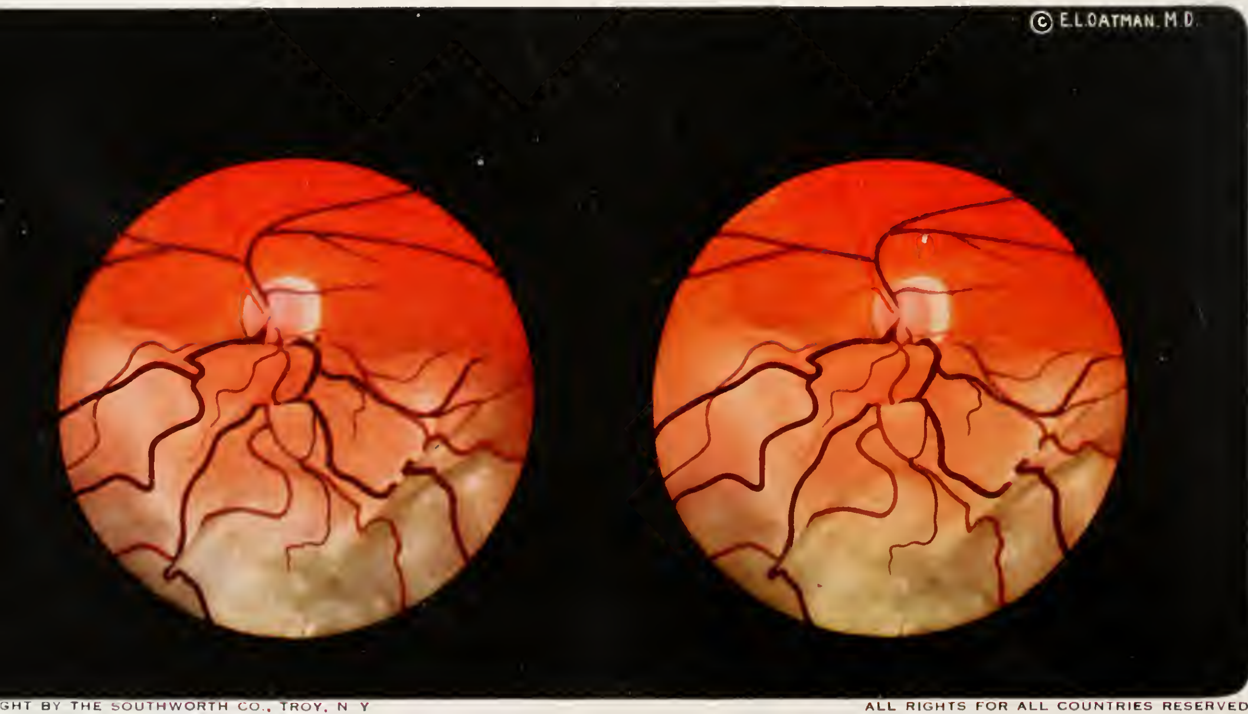
(e) Wrinkles in the retina, demonstrable either by surface light reflexes or by the course of the retinal vessels.



RECENT DETACHMENT OF THE RETINA

LEFT fundus oculi of a man, aged 60 years. The eye is myopic 9 dioptres. Two weeks ago, after violent vomiting, the left eye became nearly blind. At the present time, vision in the upper field of this eye is reduced to perception of light. On illuminating the fundus with the ophthalmoscope, the upper half presents a normal red color, but when the patient looks down the reflex becomes light grey. Examination by direct and indirect methods shows high detachment of the entire lower half of the retina. The detached membrane is thrown into wavy folds which undulate on motion of the eye. Above, where the detachment is shallow, the retina has a reddish cast which gradually merges into a grey color below where the separation between choroid and retina reaches a height of 6 mm. (18. D.). The strong reflection of light from the tops of the retinal folds produces the "shot silk" appearance characteristic of detachment. Blood vessels crossing the detachment are very dark and contain no central light streak. As they follow the folds in the retina, their course becomes very irregular and, apparently, interrupted. The optic disc is half enclosed by a myopic crescent. Transillumination of the region occupied by the detachment casts no shadow on the pupil.

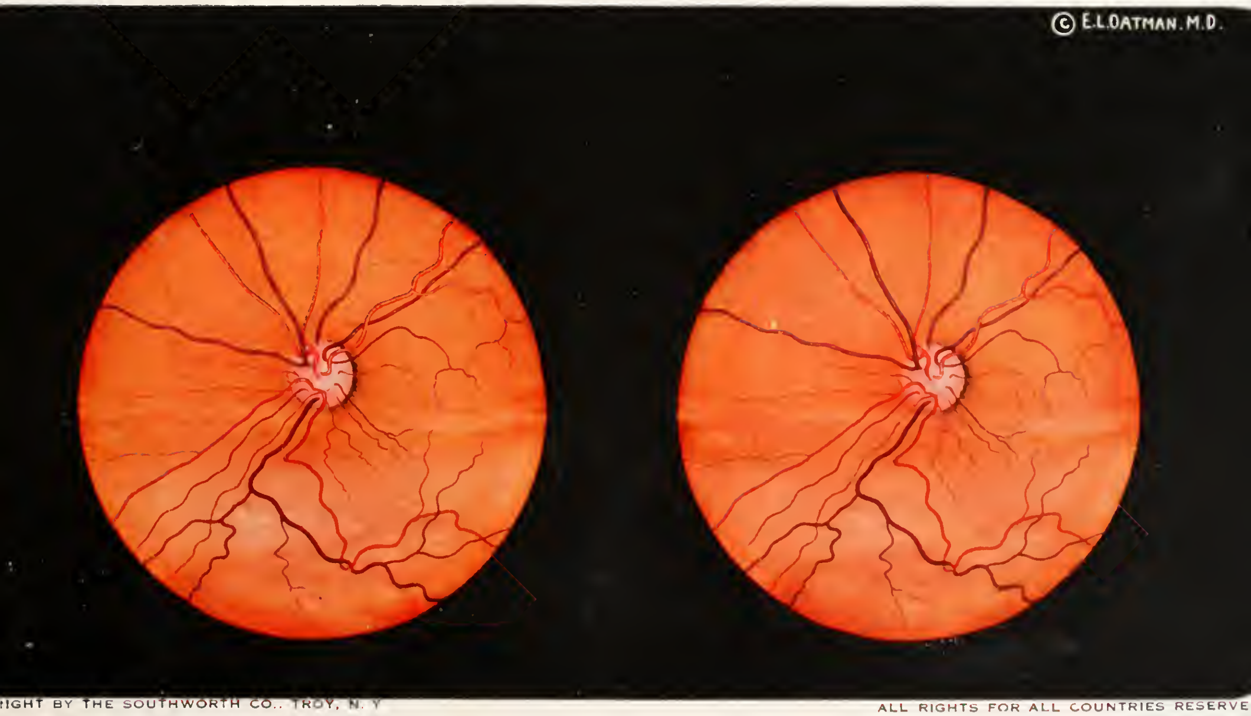
DIAGNOSIS: While no difficulty may be experienced in recognizing a detachment of the retina, its character is not always easy to diagnosticate. It always is of vital importance to differentiate simple detachment from detachment secondary to intraocular tumor.



OLD DETACHMENT OF THE RETINA

LEFT eyeground of a girl, 19 years of age. Four years ago she was struck in the left eye by a ball, which caused her to faint. Four months later a positive central scotoma, like a black disc, appeared. At that time she experienced flashes of light, which disappeared, but recently have recurred. The scotoma gradually passed away, and now central vision is 20/40. Perception of light is abolished in the upper part of the visual field. The anterior chamber is somewhat deepened. With ophthalmoscopic illumination, the fundus gives a uniform red reflex. With direct examination, the lower half of the retina is seen to be detached. The separation commences on a horizontal line passing just below the disc, and increases gradually until at the equator it reaches an elevation of 3 mm. (9. D.). The surface of the detachment is slightly undulating. The color is nearly that of the normal fundus, although faint light reflexes come from the uneven surface. The blood vessels are somewhat dilated and follow the surface inequalities of the retina. The arteries are but little darker than those in the upper part of the fundus; the veins, however, are nearly black. Just above the upper margin of the detachment are a few horizontal, yellowish streaks, which are interpreted as representing adhesions between the choroid and retina in a region formerly detached.

Diagnosis: Old, low, translucent detachments may be overlooked, owing to their red color; but once discovered they can hardly be mistaken for any other condition. The dark color and wavy course of the blood vessels are diagnostic. The form and color of the detachment shown in the stereogram do not suggest the presence of a tumor.



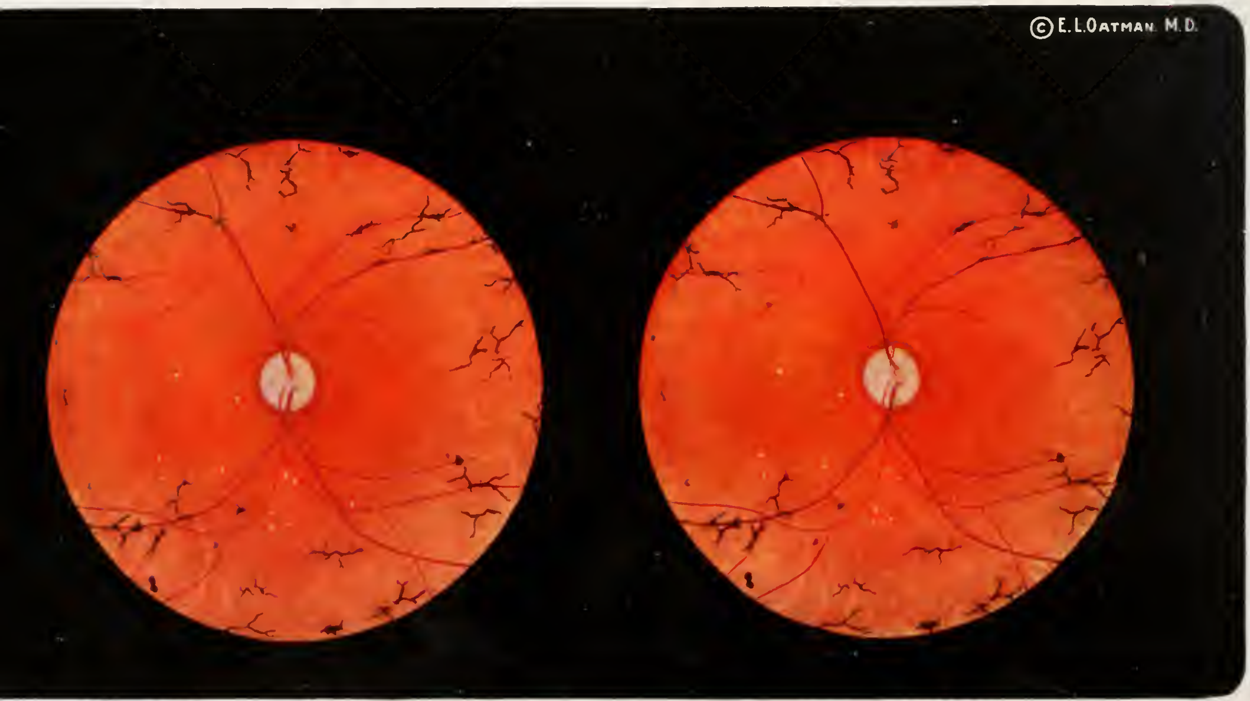
RETINITIS PIGMENTOSA

RETINITIC OPTIC ATROPHY

RIGHT eyeground of a very dark complexioned woman, 38 years of age. Family history, unreliable. Both eyes equally affected. Has had night blindness since childhood. Retained fair central vision until three years ago, when vision in both eyes gradually sank to mere perception of light.

Ophthalmoscopic picture. Probably, this fundus was once very dark. The posterior pole still retains sufficient pigment to hide the choroidal vessels, but in the equatorial zone the choroid is exposed. Except immediately around the nerve, the retina is covered with large, branching, pigment figures of the peculiar "bone corpuscle" form found in retinitis pigmentosa. The pigment figures lie in front of the retinal vessels where the two are in contact. In addition to the pigment deposits, the retina contains a number of scattered, yellowish dots, supposed to be identical with the *drusen* shown in stereogram 27. The main retinal vessels are greatly narrowed, while the smaller branches have wholly disappeared. The optic disc presents the peculiar yellowish-gray discoloration characteristic of atrophy due to degeneration of the retina. The disc is rather "hazy" and the markings of the lamina cribrosa are invisible.

Diagnosis. The fundus picture is that of retinal atrophy. That this is due to retinitis pigmentosa is indicated by the history of night blindness, commencing in childhood, and by progressive, concentric contraction of the fields terminating in blindness. Chorioretinitis is excluded by the absence of white fundus patches or other evidence of inflammatory exudation and also by the symmetrical and uniform distribution of the lesions.



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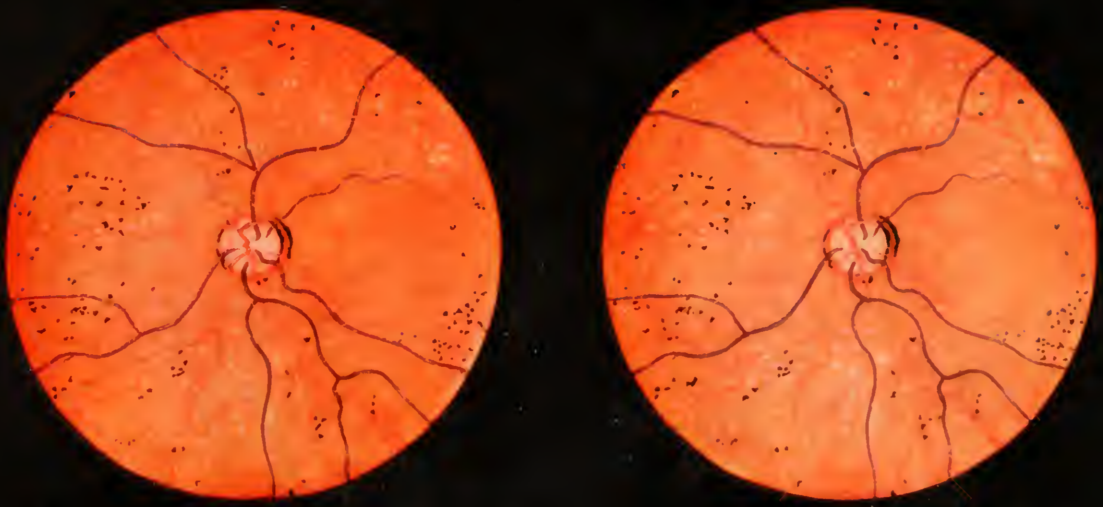
RETINITIS PUNCTATA ALBESCENS

LEFT fundus oculi of a man, 36 years of age. Urine normal. Has been unable to see in a dim light since childhood. His father, one brother and two sisters are similarly affected. The fundus conditions are the same in both eyes. The visual fields are concentrically contracted. In daylight, central vision is 20/20.

Ophthalmoscopic Picture. Except at the macula, the fundus is covered by groups of small white dots, varying in size from barely visible points to the diameter of a primary retinal vessel. These dots are not bordered by pigment, but a few independent groups of fine pigment specks are scattered over the fundus. The optic disc is atrophic. The retinal vessels are uniformly narrowed. The arteries are rather tortuous, but this is regarded as congenital and dependent upon an existing hypermetropia.

Although this retina is not entirely free from pigment, the preponderance of the white dots entitles the case to be classed as retinitis punctata albescens, rather than as retinitis pigmentosa. This case is especially valuable as showing the identity of these two conditions.

DIAGNOSIS: Retinitis punctata albescens requires to be differentiated from senile colloid excrescences and Gunn's dots, which are limited to the posterior pole or macula region. The lesions of choroiditis are never so small as those of punctata albescens. Central punctate diabetic retinitis is distinguished by the size of the spots and presence of hemorrhage. From all the above conditions punctata albescens is differentiated by hemeralopia, contracted fields and the ophthalmoscopic picture of retinal atrophy.



MACULOCEREBRAL DEGENERATION

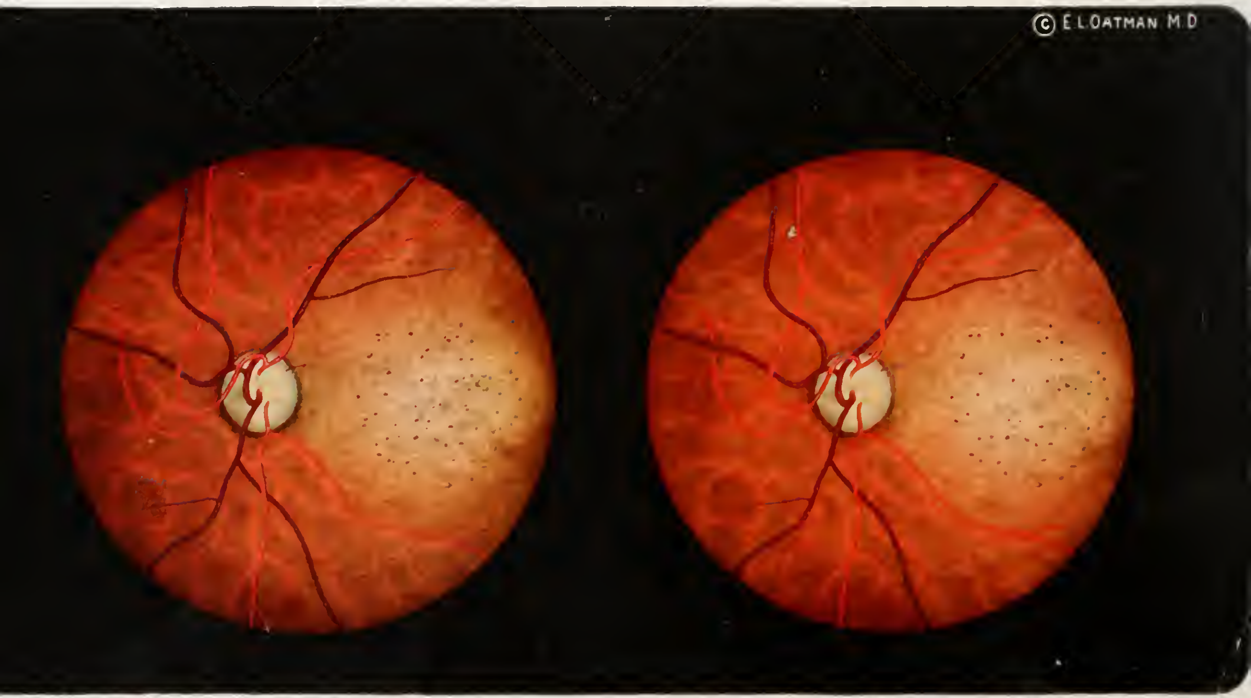
ADVANCED STAGE

GIRL aged twelve years. She possessed good vision and was an excellent scholar until the age of seven years, when vision and intellect began to fail. At the age of nine she developed epileptiform seizures which have continued at irregular intervals.

Present condition. Large, robust girl; no malformations; is moderately imbecile. Habits cleanly; pupils sluggish; lateral nystagmus; has neither day nor night blindness. There is an absolute central scotoma in both eyes, roughly estimated as 40° in the right and 10° in the left. Peripheral fields are not contracted and possess good perception of white and colors.

Ophthalmoscopic picture. Media clear. Strongly marked tigered, brunette fundus. Optic nerve atrophic. Retinal vessels narrowed but not otherwise changed. The smaller vascular twigs have mostly disappeared. The macular region exhibits a pigmentary atrophy of the retina limited to an area about two and a half times that of the optic disc. In this region the fundus is mottled; has a dirty, yellowish-grey color and is peppered with granular and dust-like pigment. A number of ill defined, light radiating lines extend outward from the temporal side of the nerve. They appear to be light reflexes. The two eyes are symmetrically affected.

Four years later the patient had almost reached the stage of complete imbecility.



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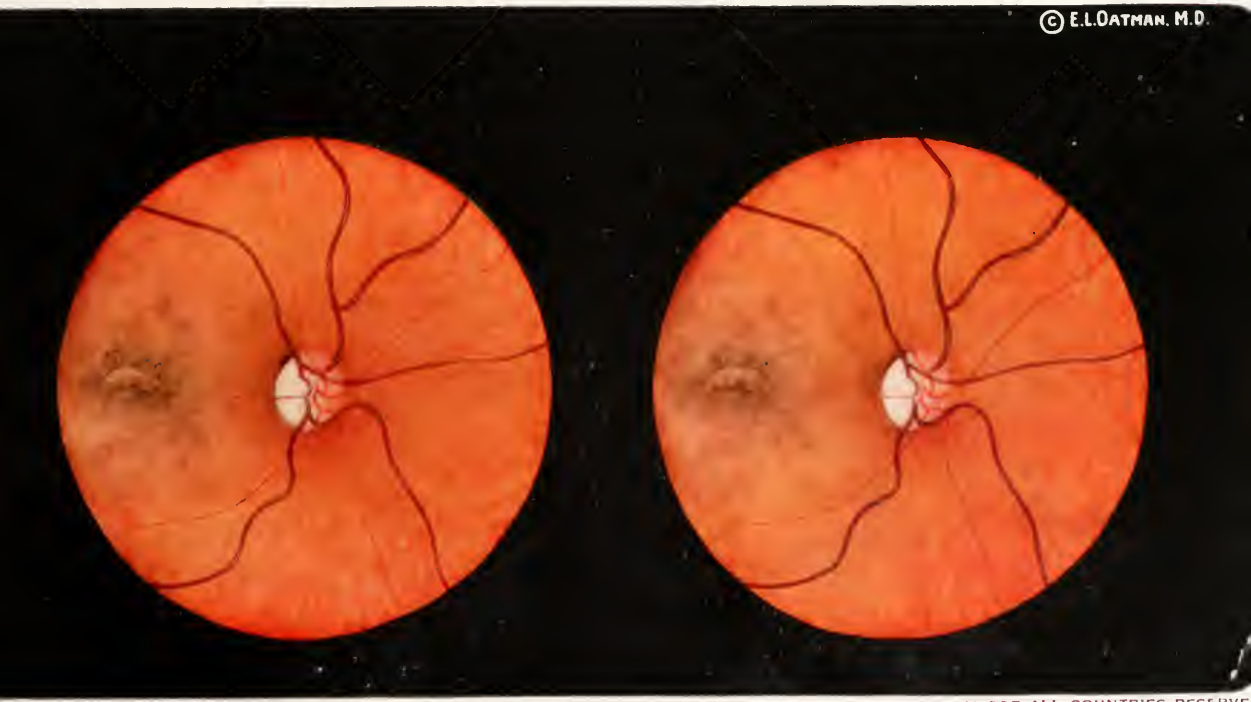
MACULOCEREBRAL DEGENERATION

EARLY STAGE

RIGHT eyeground of boy, eight years of age. Brother of girl whose eye is shown in stereogram 55. Wassermann reaction for syphilis and von Pirquet for tuberculosis are negative. He was considered a normal child until six years of age, when failure was noticed in both vision and intellect. He is in excellent health; no paralysis; no malformations. Vision in right eye is 10/200; in left 8/200. Small central scotoma for red and green. Peripheral fields normal for white and colors; central fixation; talks well and memory good.

Ophthalmoscopic picture. Media clear. Macula is encircled by a transverse, oblong ring of granular pigment, measuring about one disc diameter in length. The enclosed area has a dirty, yellowish cast and contains dark spots which can be resolved into fine black granules. The surrounding retina is covered with dust-like pigment. The optic nerve is white on the temporal side. Retinal vessels, narrowed.

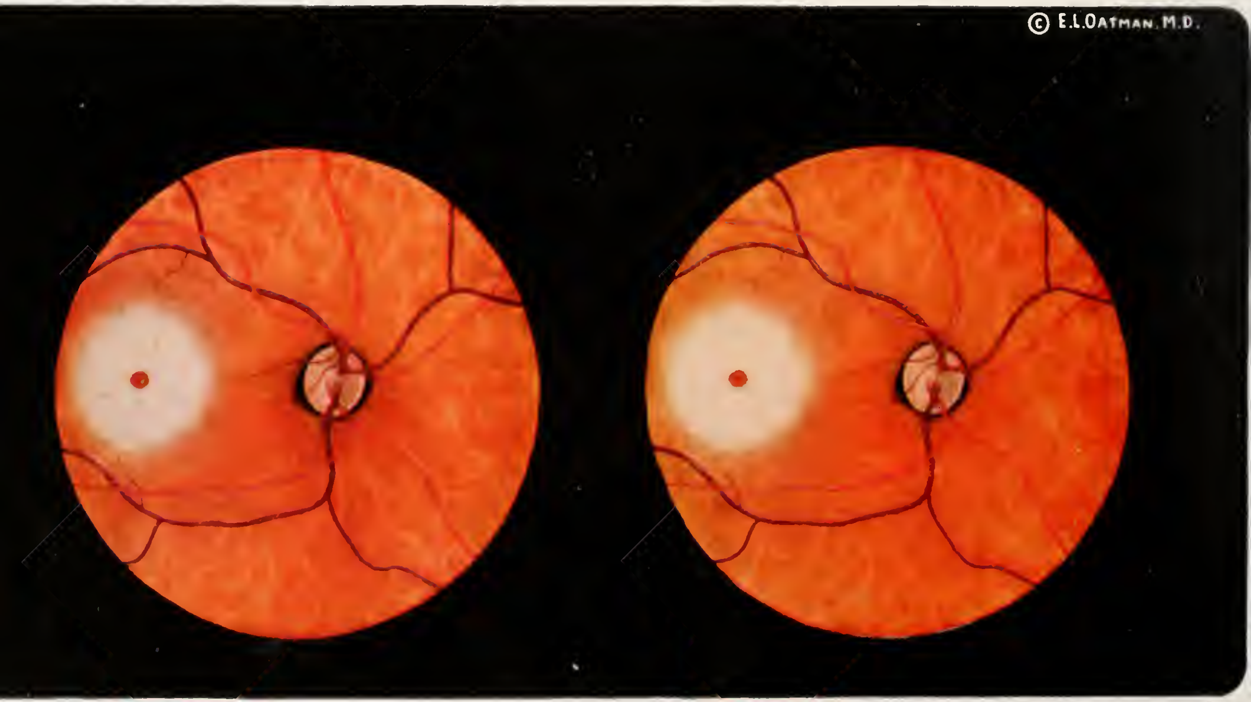
The disease steadily advanced; the central scotoma became absolute, and the patient gradually passed into a condition of imbecility.



AMAUROTIC FAMILY IDIOCY

RIGHT eyeground of male infant, aged ten months; firstborn; Russian Hebrew; parents are second cousins; the child is apathetic and appears to be blind; pupils are dilated and very sluggish; a paretic condition of the muscular system is shown by inability of the child to sit up or to support the head, which droops. *Ophthalmoscopic picture.* The fovea appears as a maroon colored spot, surrounded by a wide zone of greyish white retina. The optic nerve is pallid, especially on the temporal side. The retinal vessels appear normal and a number of small vessels around the macula, ordinarily invisible, are brought into view by contrast with the white retina.

Diagnosis: Amaurotic family idiocy is diagnosticated by the presence of characteristic fundus changes in a paralytic infant, and by the history. It is said that cerebrospinal degeneration sometimes precedes the eye changes which, however, develop later. The ophthalmoscopic picture differs from central artery closure in that the vessels are not narrowed or the retina opaque around the nerve.



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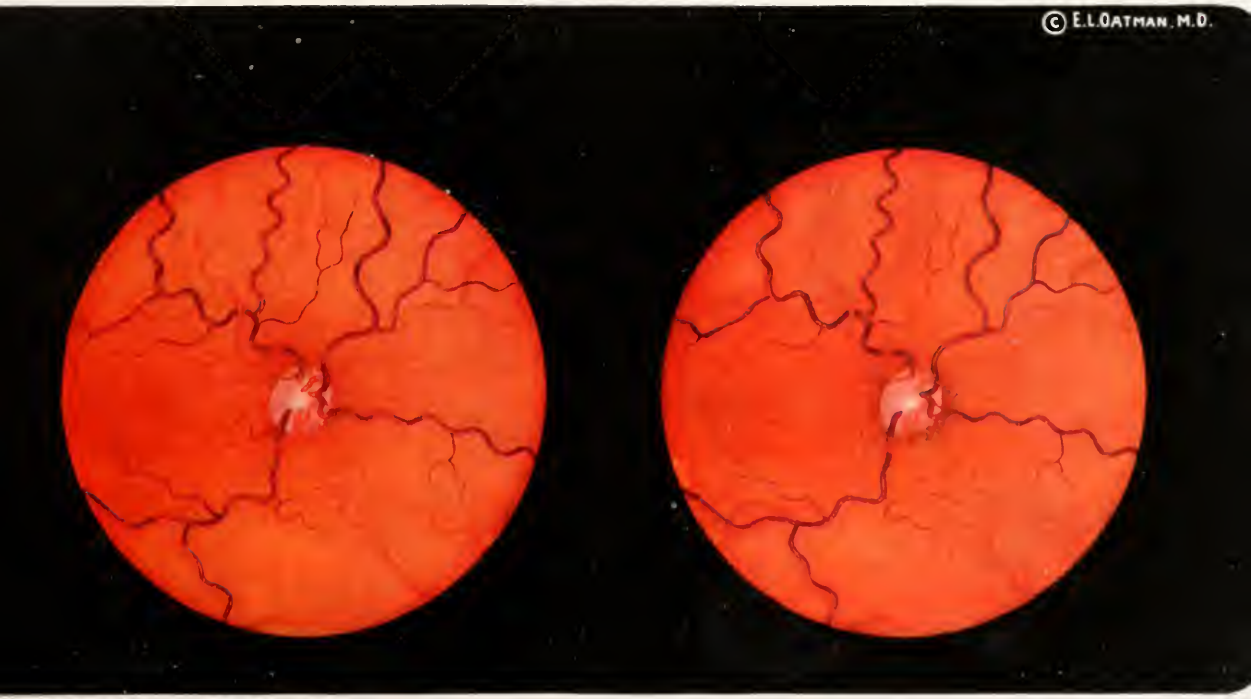
RETINA IN CONGENITAL CYANOSIS

SYNONYM: CYANOSIS RETINÆ

RIGHT eyeground of a "blue boy," 11 years of age. Since birth the skin has been cyanotic. The blue color is especially marked on the lips and eyelids. Owing to dyspnœa he has never been able to play like other children. A physical examination indicated patent foramen ovale and pulmonary stenosis. Refraction is emmetropic. Vision 20/20.

Ophthalmoscopic examination. The entire fundus has a deep red color. The optic disc appears reddened except in the physiologic excavation. Both veins and arteries are very tortuous and somewhat dilated. The arteries are not sclerosed, as shown where they cross veins without indenting them.

Diagnosis: The diagnosis of cyanosis retinæ rests upon the presence of general cyanosis. The appearance of the fundus is not very characteristic of the disease. For example, were this eye hyperopic, the ophthalmoscopic picture could not be differentiated from that sometimes presented by hyperopia. Arteriosclerosis may be excluded by the perfectly normal appearance of the vessels. Cyanosis is differentiated from inflammatory conditions by normal vision and the absence of hemorrhage, exudation and retinal edema.

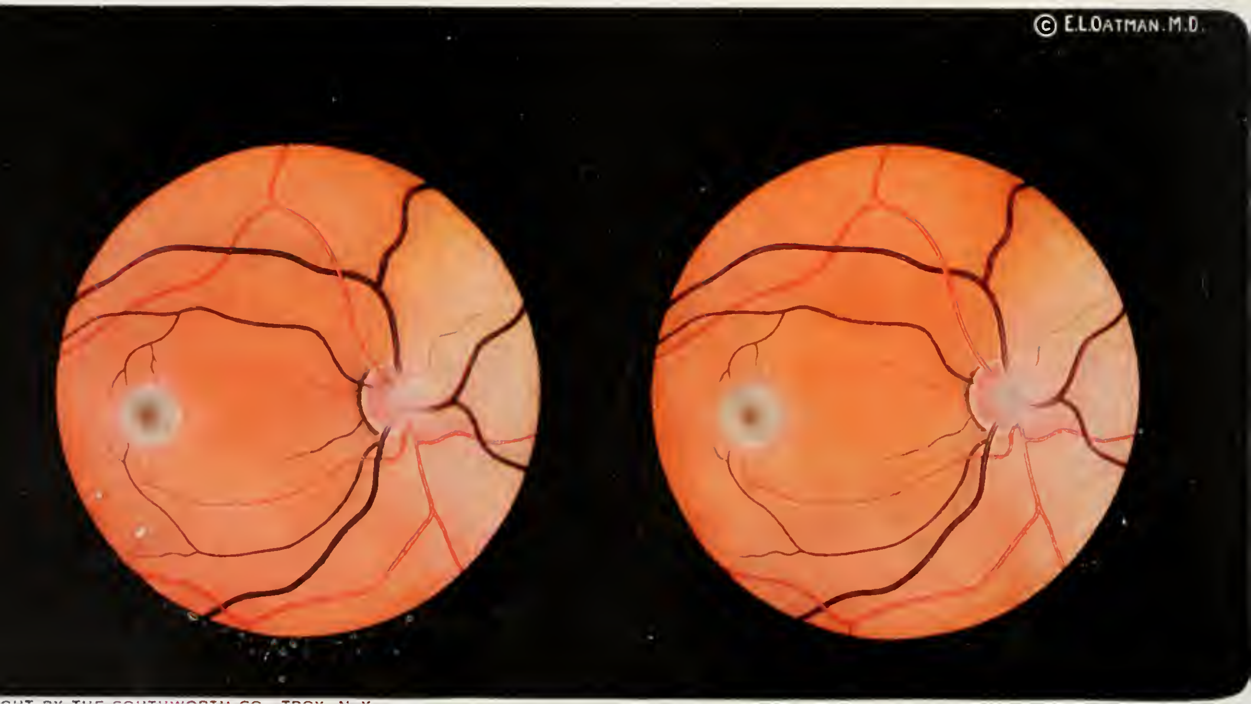


TRAUMATIC EDEMA OF THE RETINA

SYNONYM: COMMOTIO RETINÆ

RIGHT fundus oculi of a barkeeper, 33 years of age. Seven days ago he received a violent blow from the fist on the right temple, immediately followed by loss of vision in the right eye. At the present time, with this eye, he can count fingers at five feet. Retinal edema is marked around the nerve and macula and slightly developed throughout other parts of the posterior zone. The macula is occupied by a sharply defined, rounded, gray disc, in the center of which the fovea appears as a dark red spot. Around the nerve the edema is greatest on the nasal side where it nearly hides the outline of the disc. The veins are full and darkened. Arteries and veins on and near the disc are bordered by delicate white lines, supposed to represent an effusion into the perivascular sheaths. The nerve and vessels present the appearance of commencing neuritis. The vision rapidly improved, the edema disappeared, the macular spot became indistinct and within a week the fundus presented little evidence of injury.

Diagnosis: In the great majority of cases a history of injury at once leads to the correct diagnosis. Occasionally, however, the true history is suppressed. In both traumatic edema and closure of the central retinal artery, there may be retinal opacity and a red spot at the fovea. In arterial closure the arteries are greatly narrowed or invisible, while in traumatic edema the vessels are overfull. In traumatic edema the macular opacity is apt to be more sharply defined than in closure (stergms. 41, 42). Amaurotic idiots present macular opacity and a red fovea, but the subjects of this disease always are infants affected by a general paresis.

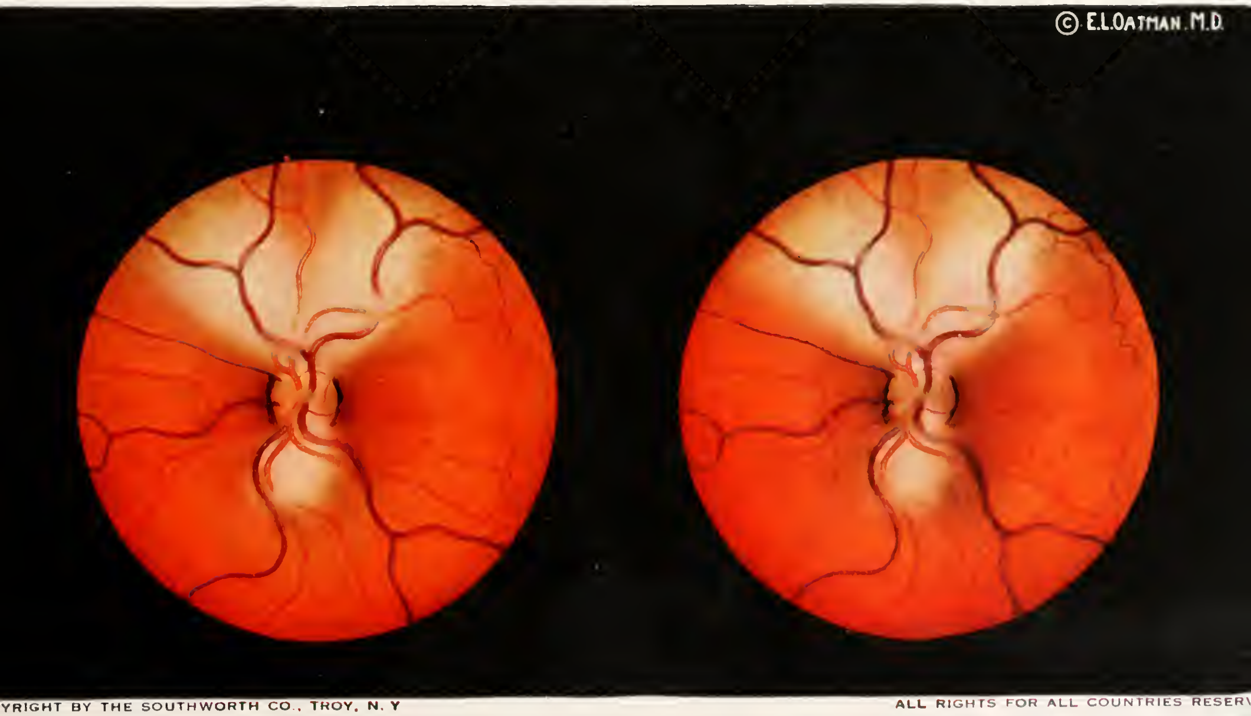


Retinitis in Wood Alcohol Toxæmia

LEFT eyeground of a young man blind from acute, methyl-alcohol poisoning. After working three weeks shellacing the interior of beer vats, where he inhaled the concentrated fumes of wood alcohol in which the shellac was dissolved, he was seized with violent vomiting and 24 hours later became totally blind. The pupils were widely dilated and unresponsive to light. About one month later he could count fingers with the left eye, but perception of light never returned to the right. Both optic nerves gradually atrophied and permanent blindness ensued.

The ophthalmoscopic picture, taken in the early stage, indicates an inflammatory edema of the retina. Both arteries and veins are dilated and tortuous. Extensive effusion of serum into the retina has occurred along the larger vessels. There is no optic neuritis, although edema from the retina has extended over the upper and lower margins of the disc. Were this nerve swollen as in neuritis, the arteries would be compressed and narrowed.

Diagnosis: As the ophthalmoscopic picture is not characteristic the diagnosis of wood alcohol poisoning must be made from the history. There may be retinal anemia with narrowed vessels, or absolute blindness may exist without visible fundus changes. Sudden bilateral blindness, occurring a few days after a debauch, is presumably due to poisoning by methyl alcohol.

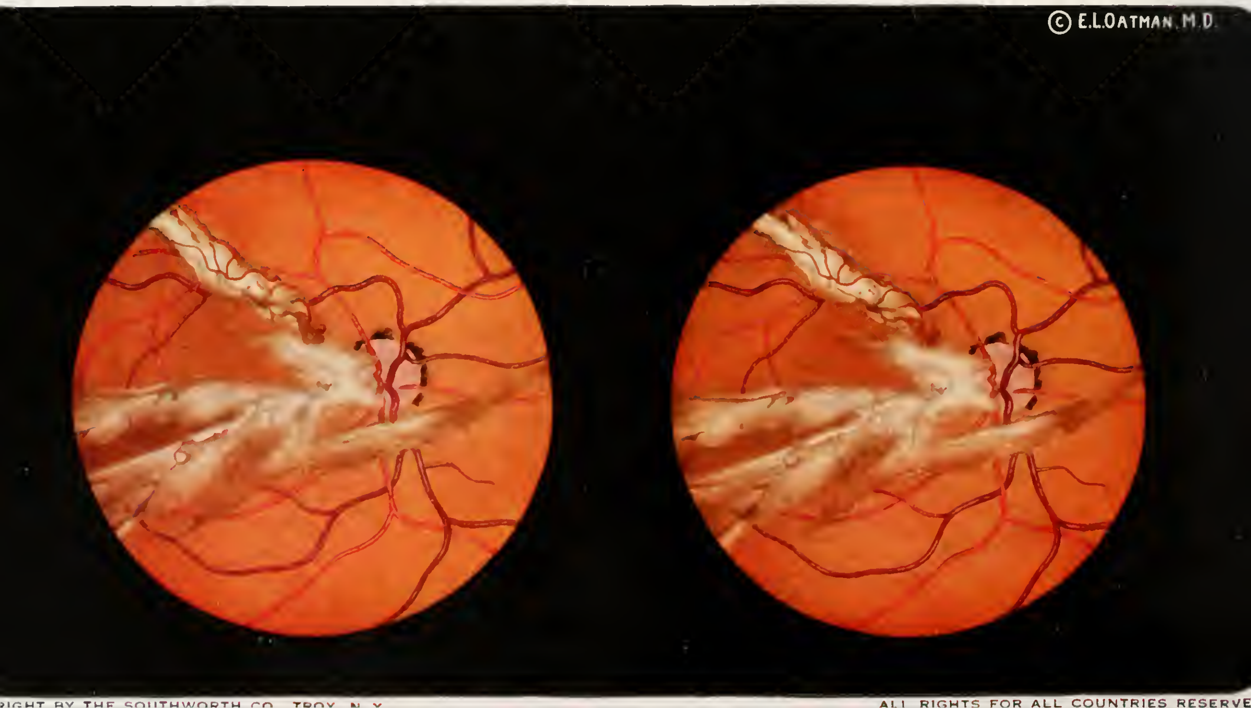


RETINITIS PROLIFERANS

RIGHT eyeground of a man, 28 years of age. He is a poorly nourished specimen of a city degenerate; blood pressure 178 mm. Hg.; surface arteries are palpable; urine contains a trace of albumin. Has often been severely clubbed by the police and beaten in fistic encounters. Following such an encounter two years ago, vision became poor in the right eye.

Ophthalmoscopic examination. The left eye contains no membranes, but a small hemorrhage has occurred between the macula and disc. The right eye contains a number of thin, membranous formations attached to the disc, some of which extend forward beyond the limits of the ophthalmoscopic field. The upper of these new formations appears to be a solid mass of connective tissue covered with adventitious blood vessels. The membranes are greyish white in color, very dense at the disc but thin and transparent anteriorly. They are immovable and do not float about in the vitreous when the eye is moved.

Diagnosis: The ophthalmoscopic picture of retinitis proliferans is unmistakable. These membranes are distinguished from detachment of the retina by their whitish color, membranous form and attachment to the nerve. Occasionally, however, retinitis proliferans leads to detachment. These formations differ from vitreous opacities of inflammatory origin in their color and immobility.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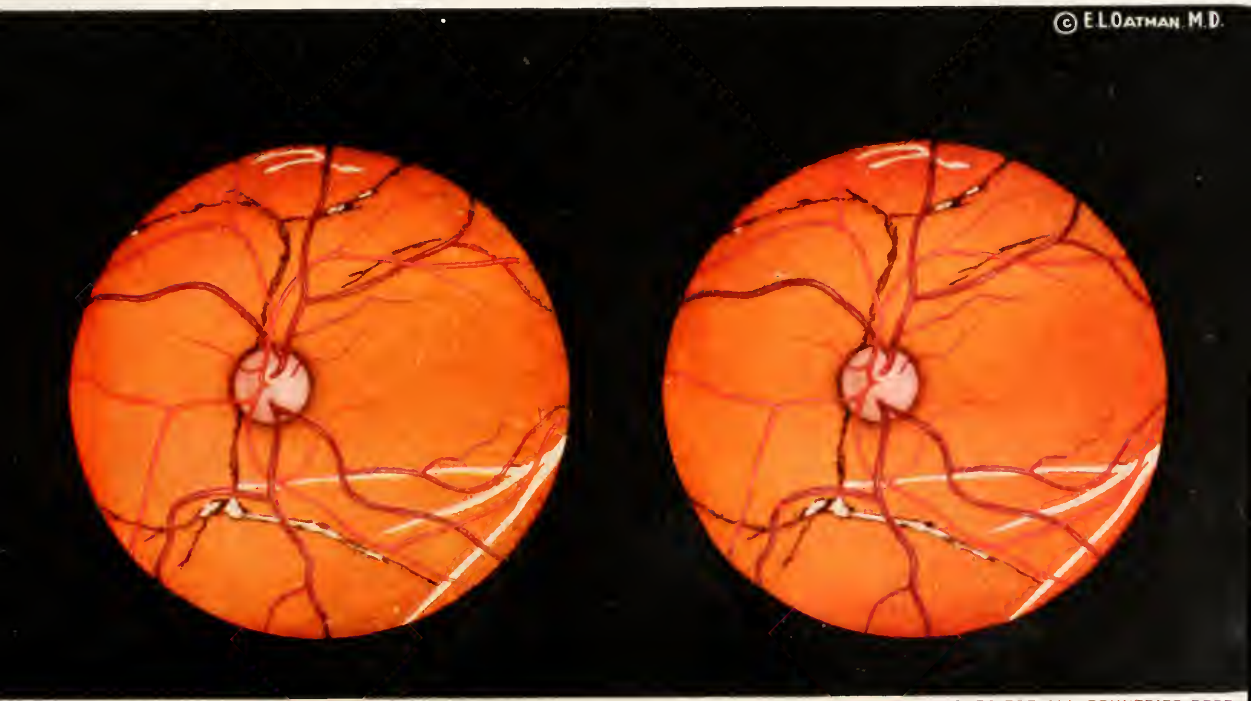
RETINITIS STRIATA

LEFT eyeground of a woman, aged 23 years. Vision in the right eye is 20/30 and in the left eye 20/50; states that vision in the left eye has always been defective.

Ophthalmoscopic Picture. Media clear; optic nerve and retinal vessels normal; the distinguishing feature in the fundus is a number of white and brownish striæ, situated in the retina behind the vessels but in no way connected with them. The striæ are white, although in many places they are overlaid or bordered by brown pigment. Two stripes start from the edge of the disc, one of which proceeds upward and the other downward. Near the disc they are straight and brown, but soon branch and exhibit an underlying white structure. These striæ are joined by others of a yellowish-white color and free from pigment extending diagonally across the retina.

The origin of the streaks in this retina can only be surmised, but I am disposed to regard them as the residue of hemorrhages which occurred either during birth or in early infancy.

Diagnosis: In retinitis proliferans (stergm. 61) the new-formed tissues are situated in front of the retinal vessels, while in retinitis striata they are behind. Retinal streaks due to reattachment of a detached retina are diagnosticated only by an undoubted history of previous detachment. A very narrow, branching rupture of the choroid, similar to the smaller tear in stereogram 28, might be mistaken for retinitis striata, but may be distinguished by its crescentic form and by its situation, which is concentric to the outline of the disc.

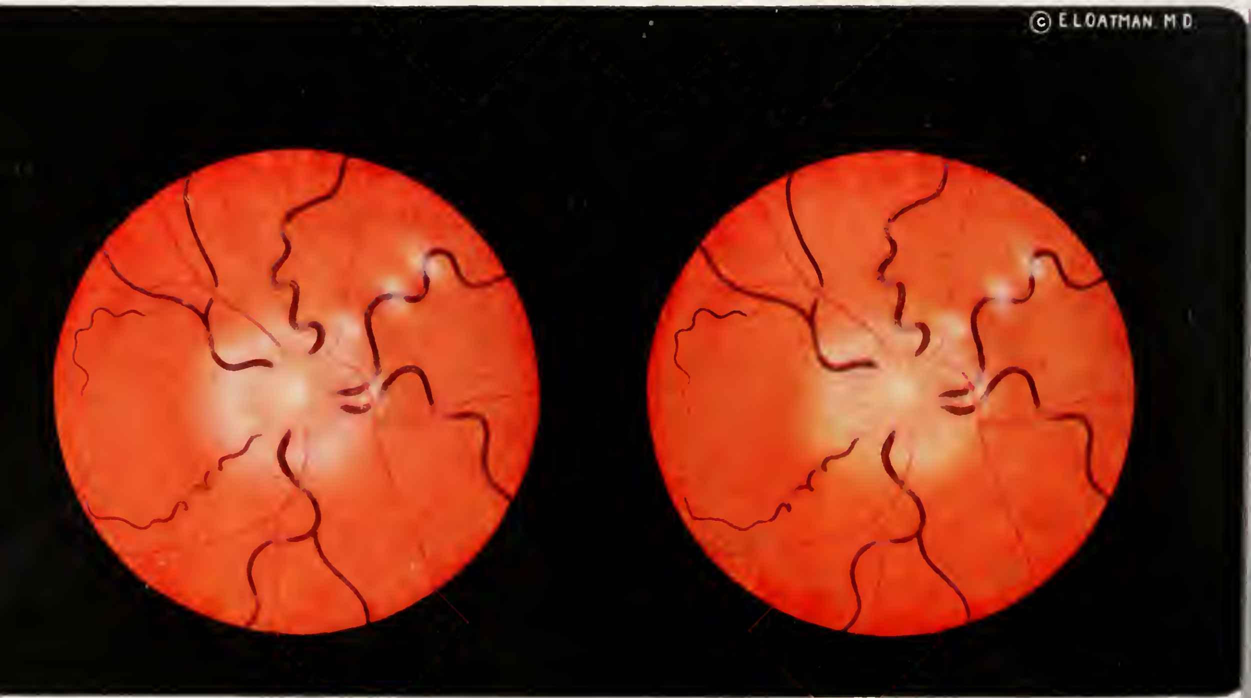


PAPILLEDEMA IN BRAIN TUMOR

SYNONYM: CHOKED DISC

RIGHT eyeground of a man, aged 37 years. Has double choked discs due to brain tumor. The fellow eye is shown in stereogram 64. *Ophthalmoscopic picture.* The head of the optic nerve forms a mound-like projection rising 1.3 mm. (5 D.) above the level of the fundus. The diameter of the disc apparently is increased, owing to extension of edema from the nerve into the neighboring retina. The swollen tissue of the nerve has compressed the retinal vessels and retarded circulation. The arteries are straight and narrowed but, evidently, are conveying more blood to the retina than the obstructed veins can carry away. As a result the veins are darkened, tortuous and dilated. Tortuosity is extreme in the inferior macular vein which twists like a corkscrew, and also in a vertically ascending vein, the convolutions of which rise and fall in a plane perpendicular to the retina. No hemorrhages are seen, but serous transudation (retinal edema) has occurred along some of the vessels.

The diagnosis of choked disc is considered in connection with the next stereogram (64) of the series.

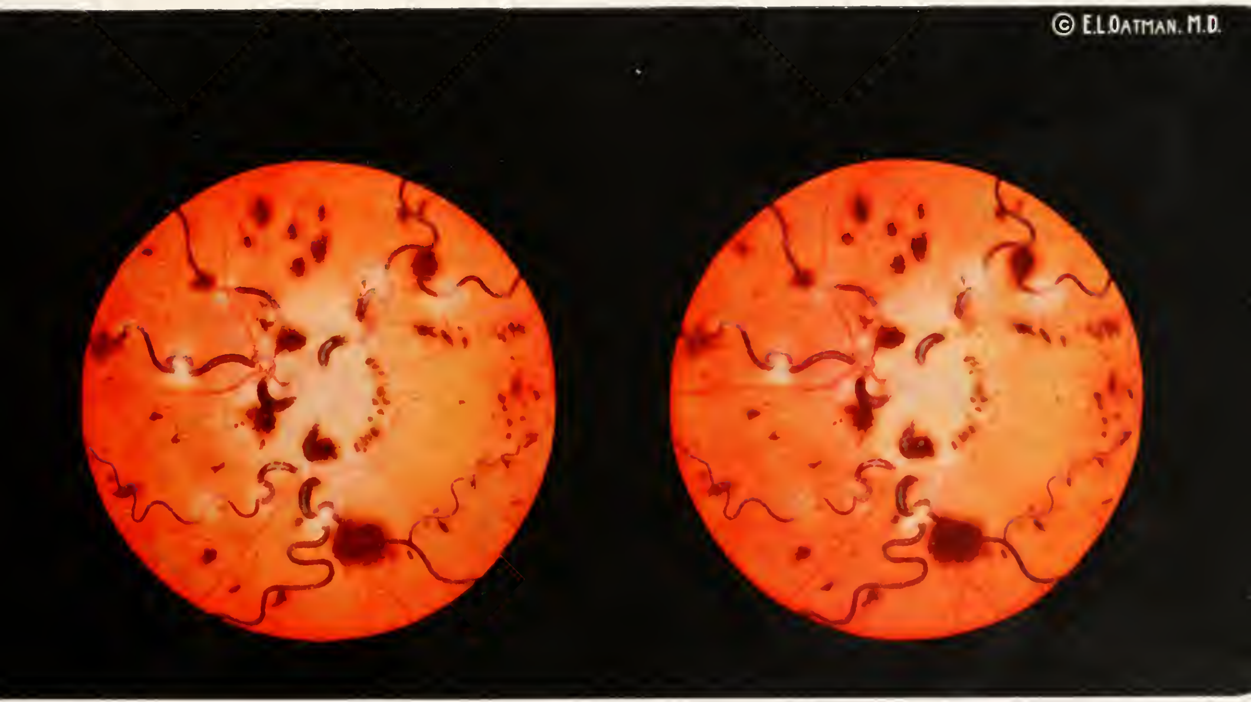


PAPILLEDEMA IN BRAIN TUMOR

SYNONYM: CHOKED DISC

LEFT eyeground of a man, 37 years of age. Has brain tumor with bilateral choked discs. The right eye is shown in stereogram 63. In the left eye the papilledema is far more intense than in the right. The nerve head forms an abrupt projection 2.5 mm. (7.5 D.) above the level of the fundus. The swelling of the nerve offers great obstruction to the return circulation, as shown by the unusual number of hemorrhages and by the retinal edema which is more extensive than commonly observed in choked disc. The arteries are small and straight. At the periphery of the fundus the veins form long sinuosities, but toward the disc they become extremely tortuous and dip, with short vertical curves, into the edematous retina until, almost bursting with blood, they force their way into the swollen nerve head. The edematous retina around the nerve presents delicate, radial striations which conform to the course of the nerve fibers. The striate, feathery hemorrhages, at the border of the disc and elsewhere, are situated in the nerve fiber layer, while the large, dark, rounded extravasations are in the deeper layers of the retina. Vision in this eye is reduced to 10/200. This deterioration is ascribed partly to degenerative changes in the nerve fibers and partly to hemorrhages in the macular region.

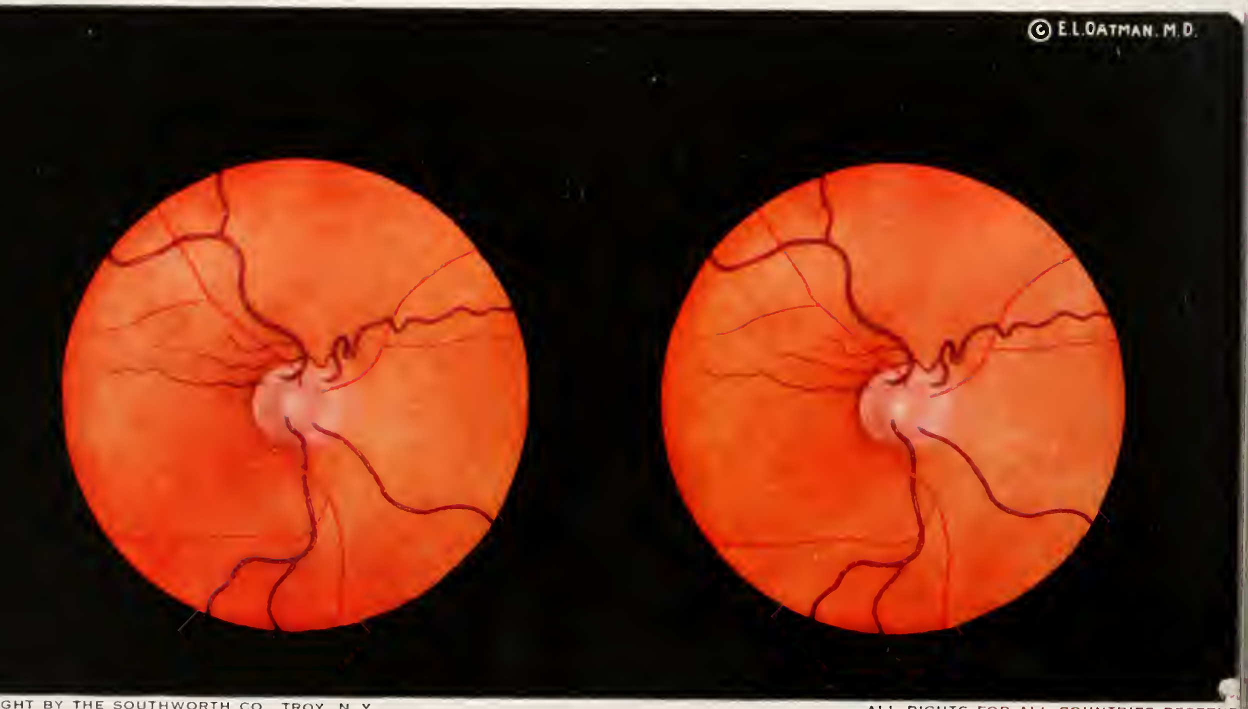
DIAGNOSIS: The enormous swelling of this nerve constitutes an unmistakable choked disc. Although, in this case, hemorrhage is abundant, it is far less than occurs in thrombosis of the central vein (stergms. 46–47); moreover, neuritis usually is absent in thrombosis and, when present, is mild in character. In albuminuric retinitis (stergms. 35–36) the exudates, transudates and hemorrhages occur independently of nerve disease or vascular constriction, while in choked disc they are proportionate to the degree of nerve swelling. The cause of choked disc is not ascertainable from the ophthalmoscopic picture, but from an investigation of the systemic condition.



PAPILLEDEMA IN NASAL SINUSITIS

RIGHT eyeground of a woman, aged 50 years. Since an attack of influenza six months ago she has suffered from headache. The left eye appears normal. Right eye, vision 20/100. Visual-fields show marked contraction for red and green with normal fields for form (white). There is mild optic neuritis. The disc is elevated about 0.5 mm. (1.5 D.); on the nasal side the outline is obscure and the adjacent retina edematous. On and near the disc, the vessels are bordered by white lines which are supposed to be perivascular sheaths. All veins are somewhat dilated and one, the superior nasal, is quite tortuous. The arteries are straight. Rhinologic examination revealed disease of the posterior accessory sinuses. Operation was followed by relief of pain, but vision did not improve and, when last seen, the nerve was atrophic.

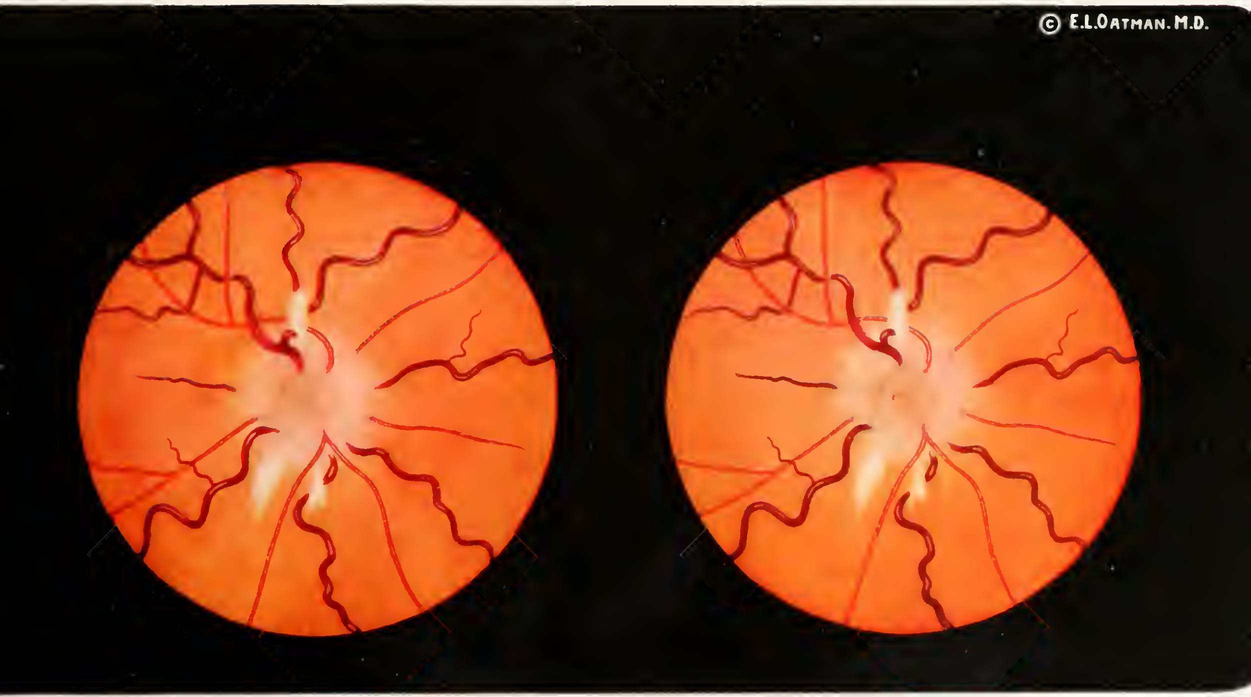
Diagnosis: Moderate, unilateral swelling of the optic disc should always suggest disease of the accessory nasal sinuses. Neuritis of nasal origin is further distinguished by the subjective symptoms of retrobulbar neuritis, *i. e.*, relative central scotoma for colors and marked contraction of the fields for red and green. The diagnosis should be confirmed by a rhinologic examination.



POST OPERATIVE OPTIC NEURITIS

RIGHT eyeground of a woman, 22 years of age. An operation on the right mastoid was followed by sinus thrombosis and meningitis. Seven days after operation paresis of the right abducens nerve developed and an ophthalmoscopic examination revealed swelling of both optic nerves. The height of the discs at no time exceeded 1 mm. (3. D.) The swollen tissue of the discs had a reddish, congested cast and around the nerves were patches of very dense, white exudate. The retinal veins were moderately congested.

Diagnosis: Evidently, this was a case of optic neuritis as distinguished from choked disc or simple edema. In choked disc swelling may be great without permanently affecting vision, unless the condition continues for a long time. In this eye the disc was but moderately swollen and the neuritis continued but three weeks; yet postneuritic atrophy resulted with vision of 20/40 and greatly contracted visual fields.

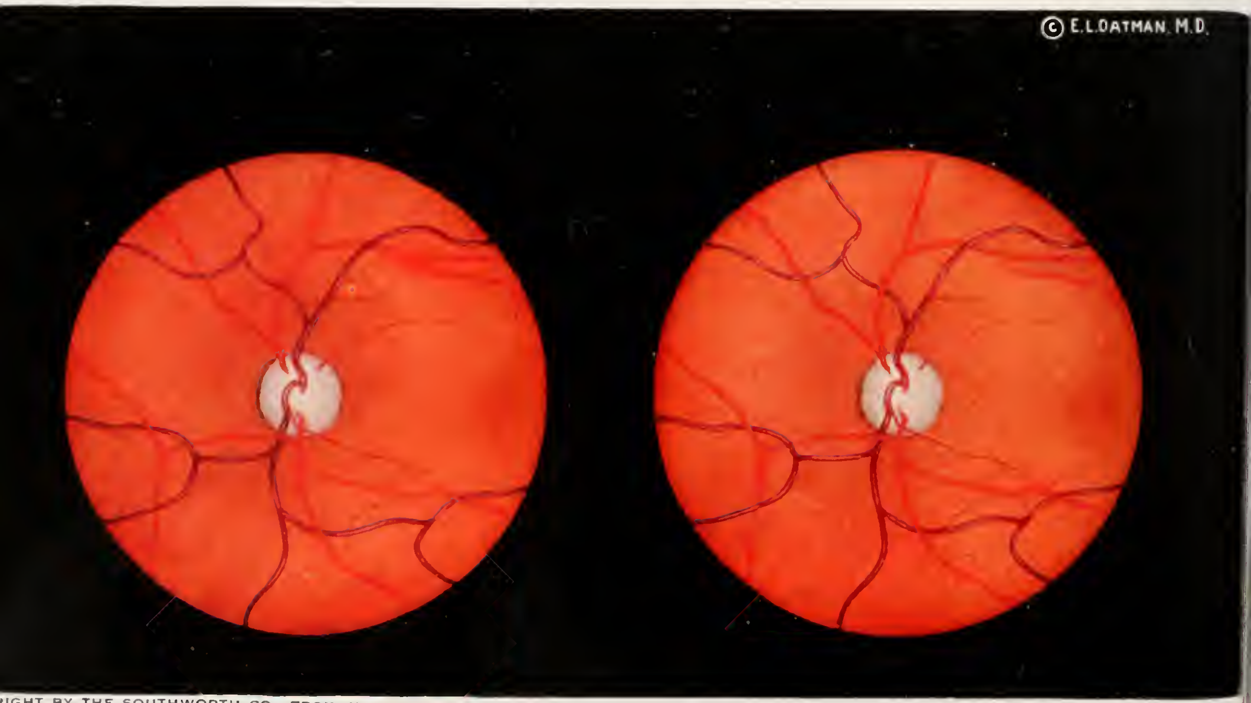


SIMPLE OPTIC ATROPHY IN TABES

LEFT fundus oculi of a man, aged 51 years. Both eyes affected. He contracted syphilis 20 years ago, for which he underwent prolonged treatment with mercury. Vision has been noticeably failing for the past five years and now is 20/100. There is concentric contraction of the visual fields; the pupils do not react to light but contract when the patient attempts to read (Argyl-Robertson reaction); patellar tendon reflex abolished; no ataxia. The optic discs are bluish-white in color, regular in outline, sharply defined and slightly depressed. The markings of the lamina cribrosa are very distinct. The circumpapillary pigment is not disturbed. The retinal vessels are normal in size and appearance.

Diagnosis: This disc presents a typical picture of simple atrophy. *Postneuritic atrophy* differs, opthalmoscopically, in that the disc is dead white, the markings of the lamina cribrosa frequently are obscured, the outline of the disc is irregular with circumpapillary pigment disturbance, and the retinal vessels are narrowed (stergm. 69). In *retinitic optic atrophy*, as distinguished from simple atrophy, the disc has a dirty yellowish color, the cribriform markings are invisible, the retinal vessels are greatly narrowed and the retina is degenerated (stergms. 22, 25, 37, 44, 53, 55). The gray atrophic nerve of *glaucoma* is recognized by the undermined edges of the disc (stergm. 72).

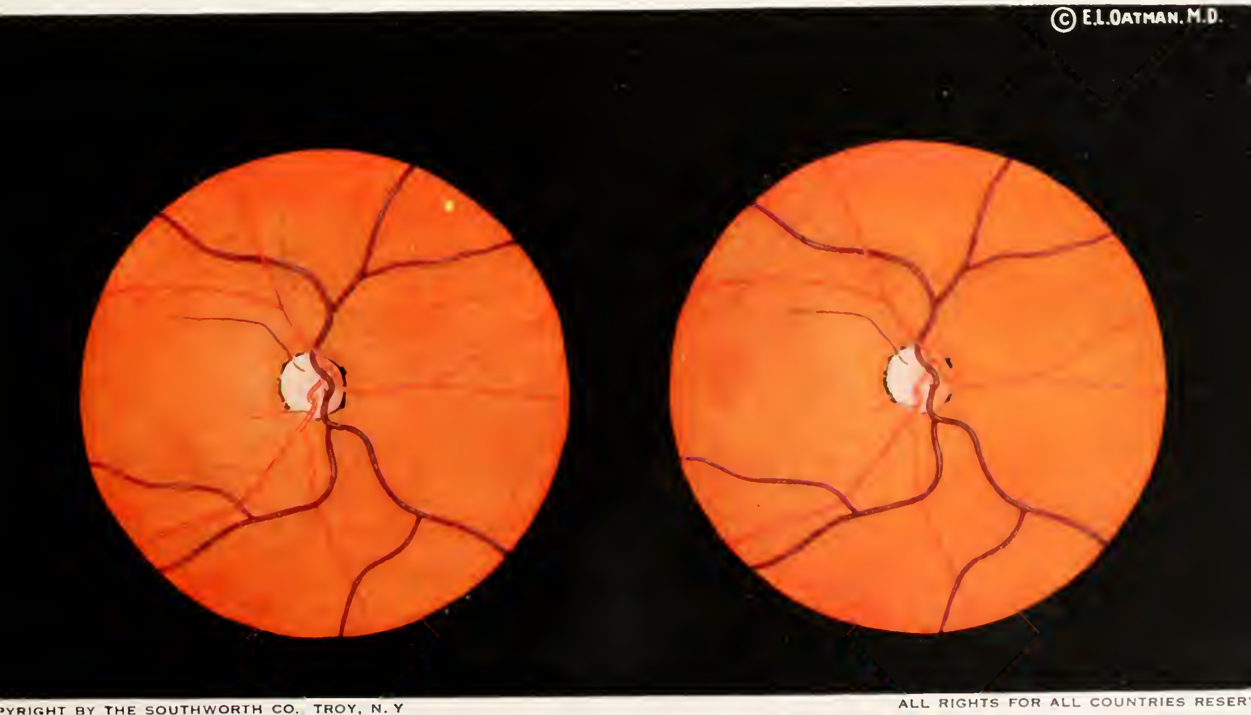
While simple atrophy is most frequently due to tabes, it occurs also in several other diseases of the nervous system. (See diagnostic card No. 5.)



Optic Atrophy in Multiple Sclerosis

RIGHT eyeground of woman, 30 years of age, with *unilateral* optic atrophy. For the past four years she has been affected with multiple sclerosis. Cannot walk well; has difficulty with speech; memory is very poor; voluntary motions excite tremor; has had transient paralysis of the external ocular muscles; nystagmus develops when she attempts to fix a close object. Right eye, vision is 20/70: irregular concentric contraction of the visual field. Left eye, vision 20/30: visual field shows small, scattered central scotomata. This nerve is not ophthalmoscopically atrophic, nevertheless it is affected. In the right eye the temporal side of the disc is decidedly gray in color, although the atrophy is not sufficiently advanced to reveal the markings of the lamina cribrosa. On the nasal side the disc presents a normal color. The outline of the nerve is sharply defined and there is no evidence of previous disturbance in the surrounding fundus. The retinal vessels are normal in size and exhibit no evidences of sclerosis.

Diagnosis: In this eye the ophthalmoscopic diagnosis of simple atrophy depends upon the light gray color and sharp outline of the disc, the healthy surrounding fundus and the normal retinal vessels. Unilateral optic atrophy in a young adult, especially if the atrophy is limited to the temporal side of the disc, should at once suggest multiple sclerosis as the underlying cause. Atrophy limited to one optic nerve may follow diseases of the accessory nasal sinuses, traumatism, tumors (stergm. 79), etc. In this group of cases the entire nerve is atrophic and vision is greatly reduced or lost.



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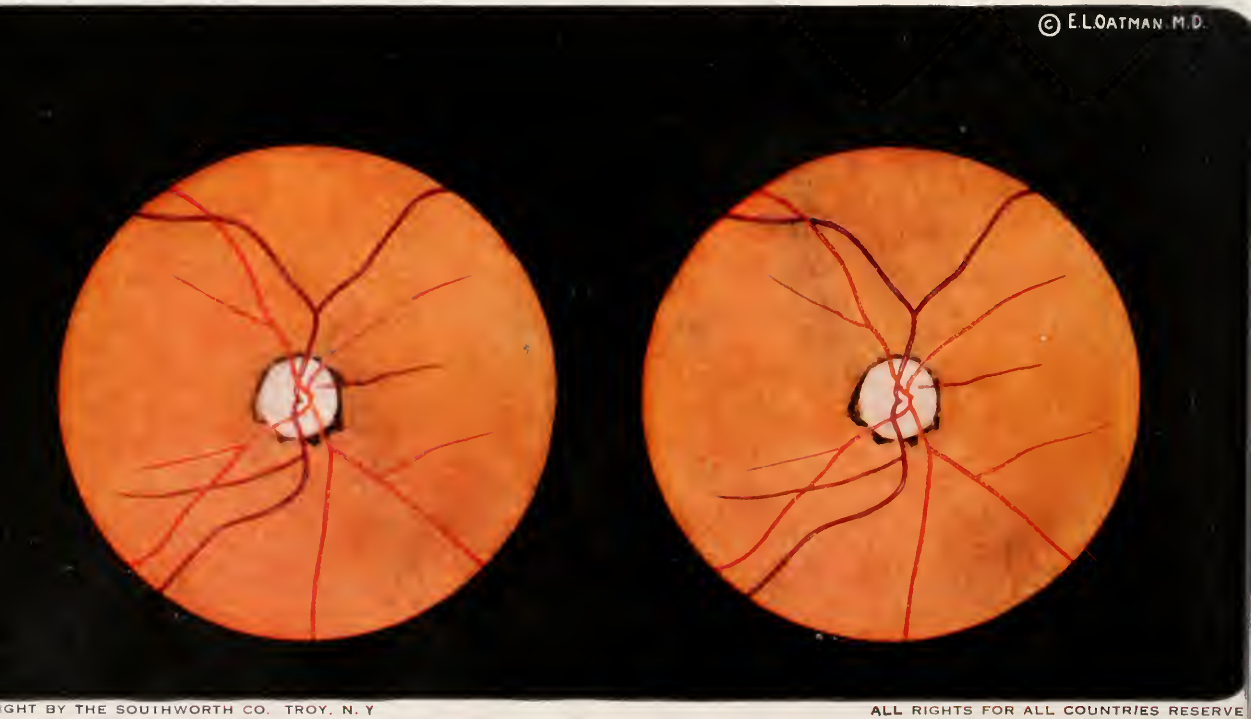
NEURITIC OPTIC ATROPHY

SYNONYM: POSTNEURITIC ATROPHY

RIGHT eyeground of a woman 29 years of age. Nine years ago she acquired chancre from her husband and was treated at the hospital for over a year. Four years later she was ill for a long time and suffered from violent headaches, vertigo and trouble with vision. The Wassermann reaction for syphilis is positive. Central vision is 20/50 in this eye. There is concentric contraction of the visual fields, greater for white than for colors. The ophthalmoscopic picture is that of postneuritic atrophy. The white optic disc is rendered very conspicuous by contrast with the surrounding fundus. Its outline is sharp but slightly irregular. The circumpapillary pigment is superabundant and in some places appears to have been pushed away from the nerve. The disc presents a smooth, dense surface on which all physiologic depressions and markings are obscured. All the retinal vessels are uniformly contracted and the smaller branches have disappeared. Some of the arteries have sclerosed walls, as shown by white bordered blood columns.

Diagnosis: Neuritic atrophy is ophthalmoscopically distinguished by a very white, smooth surface of the disc as compared with the grey, cribriform nerve of tabes, or the yellowish disc of retinitic atrophy. In tabetic atrophy the retinal vessels are normal, or nearly so. In retinitic atrophy the vascular degeneration is greater than in neuritic atrophy.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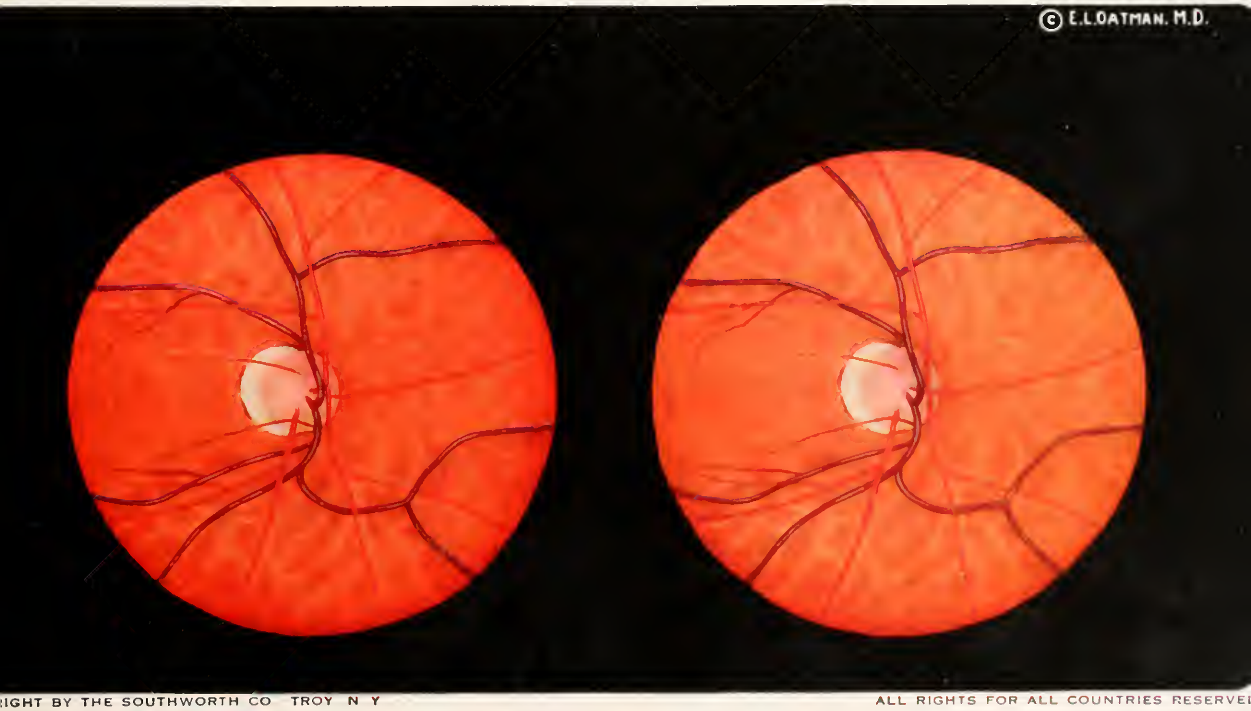
NONPROGRESSIVE MYOPIA

RIGHT eyeground of a man, 30 years of age: Bookkeeper. With a concave lens of 6.5 dioptres vision is 20/20. His refraction has not changed since he was 18 years of age. The ophthalmoscopic picture is characteristic of benign myopia. The retinal pigment is sufficiently rarefied to reveal the choroidal vessels. The vertical retinal vessels at the disc are slightly inclined toward the temporal side and all vessels pursue a straight course. The optic disc is normal in color. On the temporal side it is bordered by a white, crescentic figure, the outer margin of which is marked by a line of pigment. This figure is known as the myopic crescent or conus.

Diagnosis: Myopia is diagnosticated by testing the refraction rather than by the ophthalmoscopic appearance, although the conus and straight retinal vessels are characteristic.



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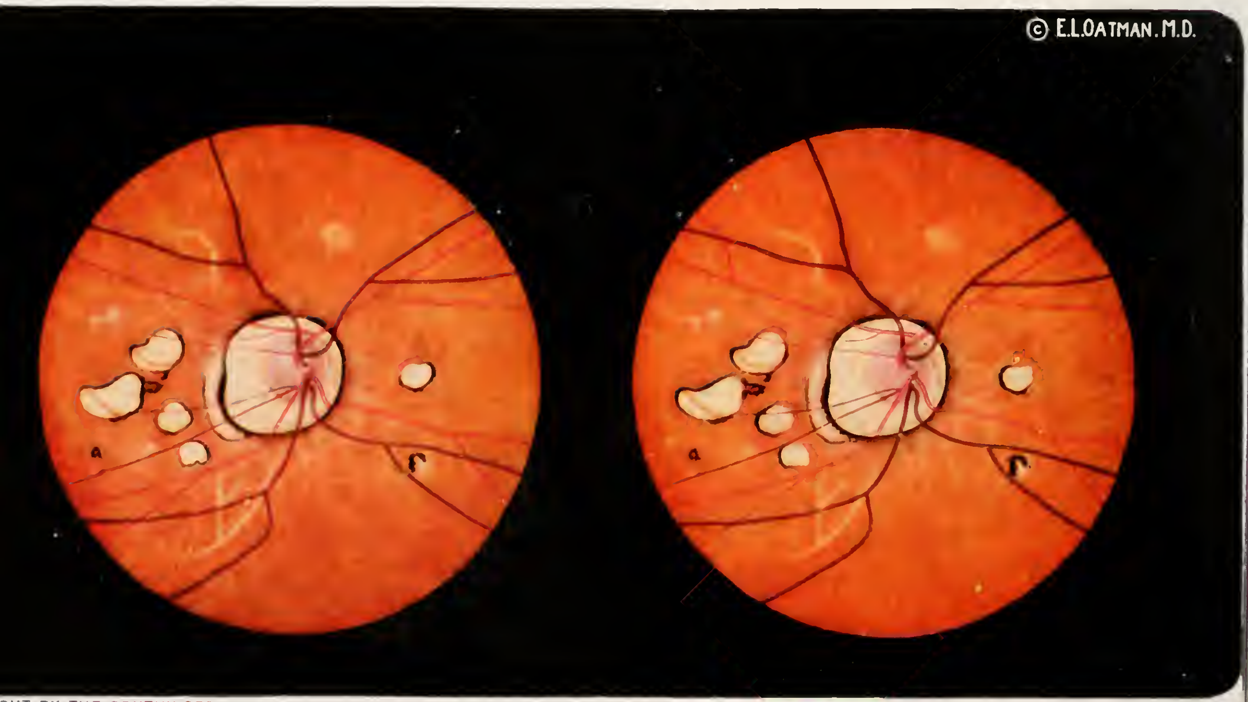
PROGRESSIVE MYOPIA

RIGHT eyeground of a woman, aged 42 years: Cook. The right eye is myopic 20 dioptres; the left, 18 dioptres. In the right eye, vision with glasses is but 20/200. Cannot remember that she ever saw well.

The fundus presents the ophthalmoscopic picture of pernicious myopia. The retinal pigment has mostly disappeared, leaving the choroidal vessels exposed throughout the entire fundus. The retinal vessels, which normally pass vertically upward and downward, are dragged to the temporal side and straightened. The disc is surrounded by a wide, white ring of atrophic choroid containing a few specks of pigment and traces of choroidal vessels. This circumpapillary ring is too extensive to be regarded as a congenital crescent. On both the nasal and temporal sides of the nerve are several atrophic spots or cicatrices bordered by pigment, identical in appearance with those which follow an eruptive lesion in exudative choroiditis. In myopia, however, the cicatrix is not the result of disease but of a mechanical laceration. The pigment around the spots in this fundus is exuberant for myopia. The softly outlined spots in the upper field are supposed to be gaps in the choroid in process of repair. Several white walled, sclerosed choroidal vessels are seen in which the blood column is reduced to a mere thread. Sclerosis of the choroidal vessels is most advanced near the disc.

Diagnosis: The differentiation of myopic lesions from those produced by disease depends largely upon the refraction of the eye. It must be borne in mind that choroiditis from constitutional causes may develop in a myopic eye and be mistaken for a manifestation of myopia. The choroidal lesions of myopia are comparatively few in number and limited to the posterior pole; while those of choroiditis are numerous and widely distributed, but favor the equatorial region. Both myopia and exudative choroiditis attack the macular region.

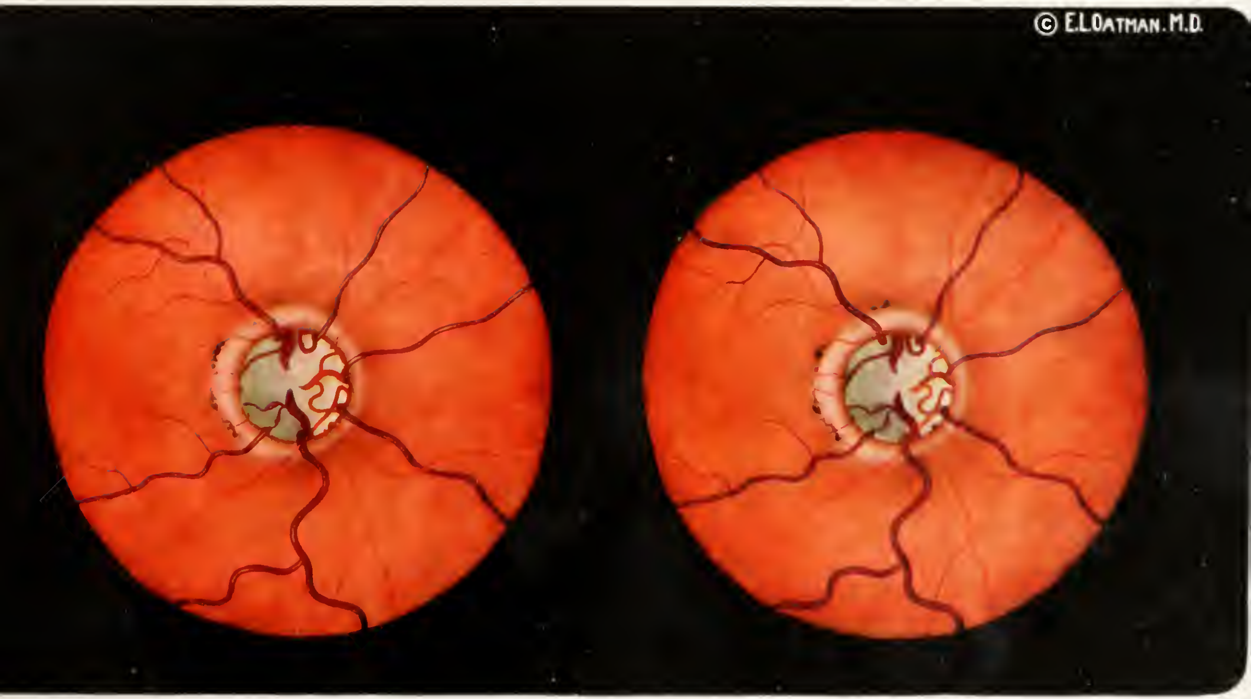


SIMPLE GLAUCOMA

TOTAL EXCAVATION OF DISC

LEFT eyeground of a man, 52 years of age. Vision has been gradually deteriorating for the past ten years. Left eye has become totally blind. Right eye has central vision of 20/100. The visual field is contracted, especially on the nasal side. The eyes have never been painful. Urine normal. Blood pressure 155 mm. Hg. Schiötz tonometer recorded the intraocular pressure as 80 mm. Hg. The anterior chamber is shallow; pupil dilated and sluggish; cornea lens and vitreous are transparent. The disc is depressed about 1 mm. (3. D.) and presents the grayish green color of optic atrophy. A wide ring of glaucomatous atrophy surrounds the excavation. The retinal veins are overfull and tortuous; the arteries are narrowed and many of the smaller branches have atrophied and disappeared. One artery on the nasal side crosses the opening of the pit without sinking until it passes under the excavated border. Another small vessel on the temporal side emerges from the disc, forms a loop and again enters the excavation; this is regarded as an example of the congenital anomaly known as optico ciliary artery. On the floor of the excavation are two small veins containing short dilations (phlebectasiæ). Very slight pressure on the globe produces pulsation in both arteries and veins.

Diagnosis: Glaucoma is ophthalmoscopically recognized by the characteristic excavation of the disc extending to the very edge, which is either precipitous or undermined. Physiologic excavation does not include the entire nerve head; although sometimes it assumes a funnel-form which commences as a declivity from one edge of the disc (stergms. 5, 16, 49). Very rarely, after the optic nerve is severed, atrophy may be so extreme as to produce depression of the entire disc (stergm. 25). In glaucoma the retinal arteries may pulsate spontaneously; in any event, pulsation is produced by very slight external pressure on the eye.

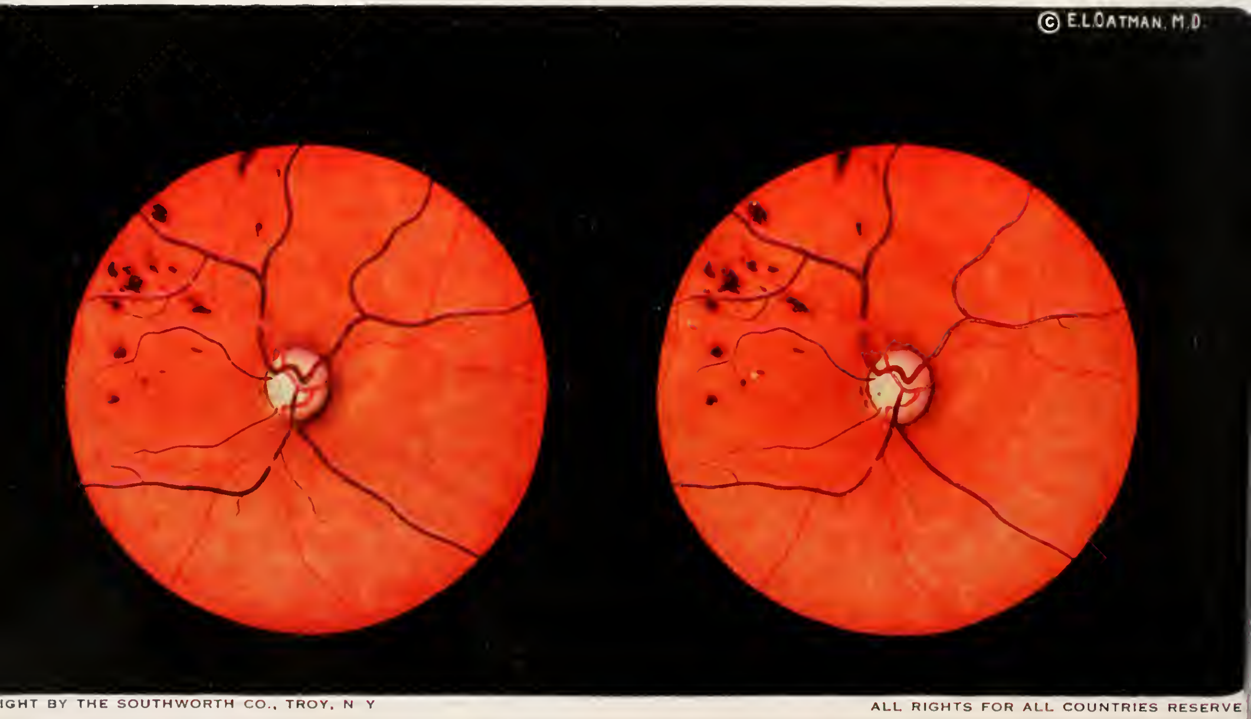


GLAUCOMA WITH ARTERIOSCLEROSIS

Early Glaucomatous Excavation of Nerve, So-Called Hemorrhagic Glaucoma

RIGHT eyeground of a man, 72 years of age. Has general arteriosclerosis. Both eyes are affected with glaucoma simplex. Two weeks ago a "blur" suddenly appeared before the right eye. Vision, 10/200: tension, taken with the finger, is plus. The temporal side of the nerve presents a typical glaucomatous excavation. A light halo in the adjoining fundus marks commencing choroidal atrophy. The excavation extends to the temporal edge of the disc, which is slightly undermined. The nasal side of the depression is precipitous, but has not yet extended to the margin of the nerve. The floor is gray in color and distinctly shows the perforations in the lamina. The main retinal vessels are displaced to the nasal side of the nerve. The ascending and descending retinal arteries are sclerosed as shown where they cross and obscure underlying veins. Numerous small, striate hemorrhages are scattered throughout the macular region and along the supratemporal vessels.

Diagnosis: Acute inflammatory glaucoma is an emergency disease which, if recognized, is readily relieved; while a mistake in diagnosis usually results in destruction of vision. Notwithstanding the vital necessity of recognizing this not uncommon affection, it is seldom diagnosticated by the general practitioner; in fact, a large proportion of glaucoma cases which enter our clinics have had their condition aggravated or their vision even destroyed by the use of atropine, dropped into the eye for a supposed iritis.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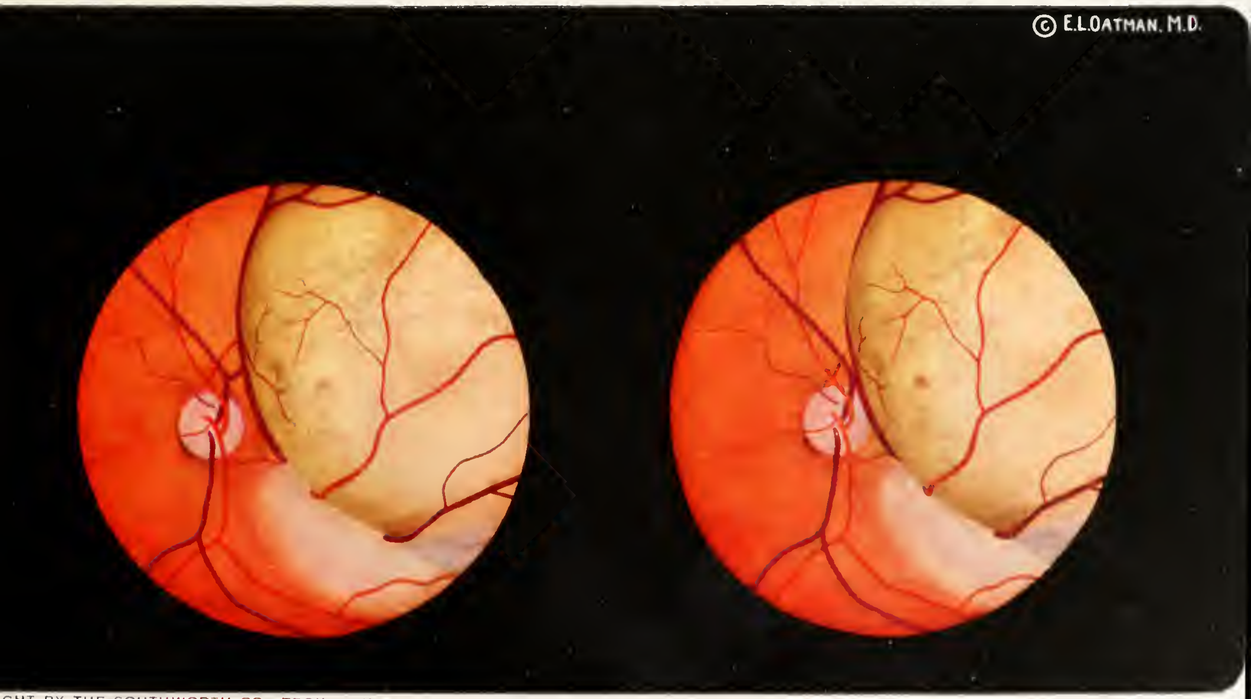
SARCOMA OF THE CHOROID

LEUCOSARCOMA

RIGHT fundus oculi of a healthy farmer, 44 years of age. Left eye normal. In the right eye vision has gradually been disappearing for the past six months. Obscuration began on the temporal side and slowly extended like a black curtain across the visual field. There has been no pain in the eye.

Present condition. Externally, the eye appears healthy. Tension normal. The ophthalmoscope reveals a circumscribed, globular tumor at the posterior pole, close to the nerve on the nasal side. This is diagnosticated as sarcoma from its form, immobility on movement of the eye and light flesh color. Several large vessels cross its surface which, from their direction and method of division, are supposed to be retinal. No adventitious vessels are observed. A small simple detachment of the retina adjoins the tumor below, recognized by a slight tremor of the surface on sudden movement of the eye, and also by its color.

Diagnosis: The diagnosis of sarcoma of the choroid is comparatively easy when, as in the above case, there is but little collateral detachment of the retina. It becomes difficult, however, when the tumor is small and the detachment total. In every detachment the possible presence of intraocular tumor should be considered. Even traumatic detachments are not beyond suspicion, inasmuch as slight injury suffices to produce detachment when a tumor exists in the eye.



SARCOMA OF THE CHOROID

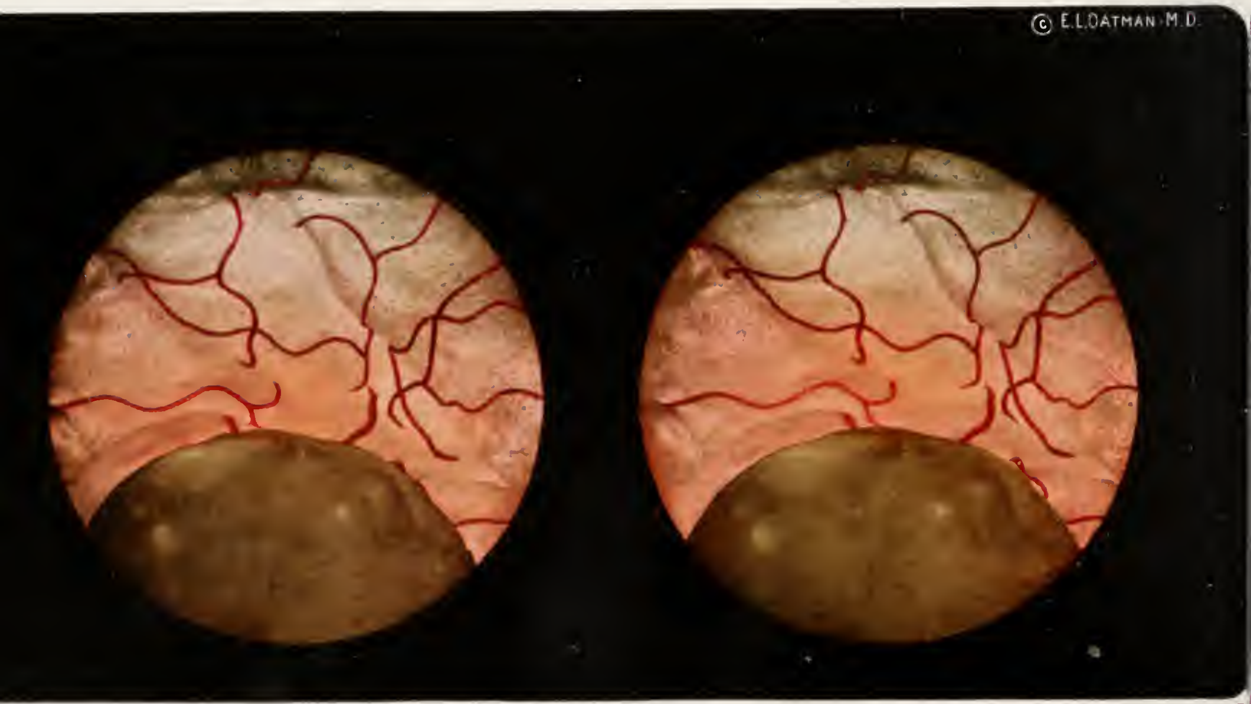
MELANOSARCOMA WITH TOTAL DETACHMENT OF THE RETINA

RIGHT eyeground of a man, 47 years of age. Five months ago he first noticed a cloud in the upper field of this eye, which very gradually increased in size until three weeks ago when the eye rapidly became blind.

Present condition. The ciliary region is not reddened, but a single dilated anterior ciliary vein appears below on the sclera. The media are clear. Anterior chamber appears of normal depth. Eye tension, by digital palpation, is normal. Within the past day or two he has experienced a sense of discomfort in the eye. Vision is reduced to perception of light in the lower field with an absolute scotoma above.

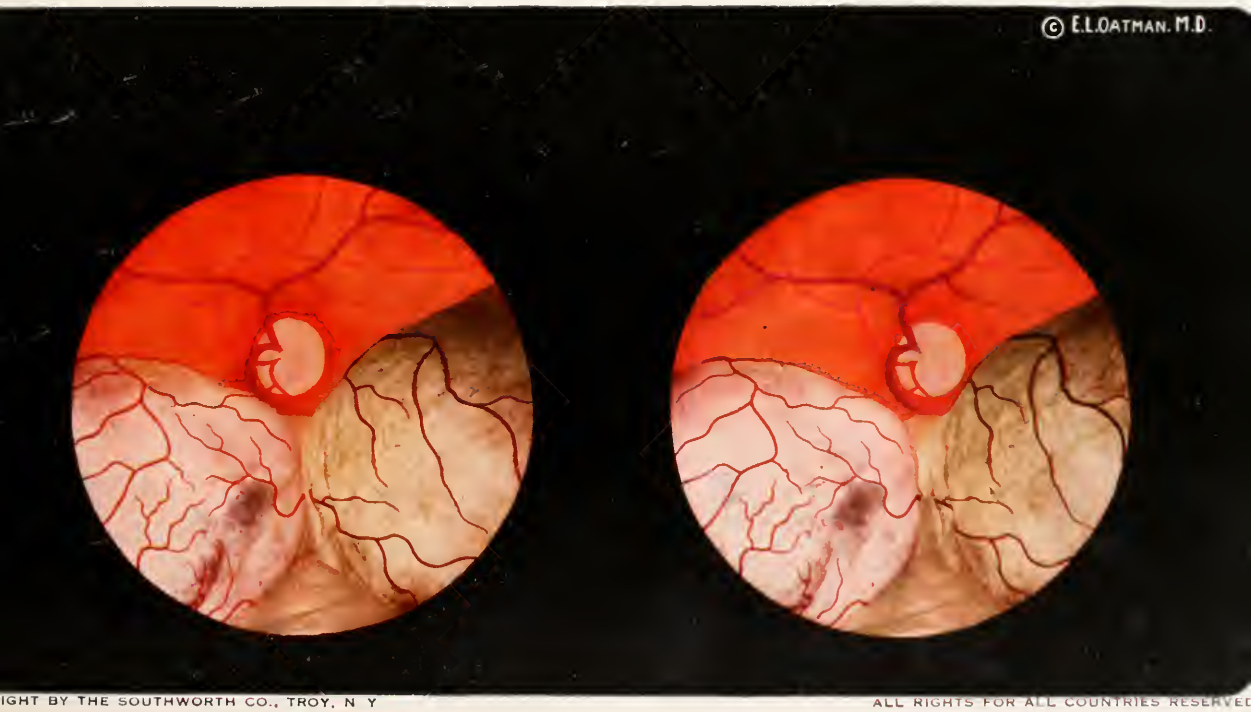
Opthalmoscope. The retina is completely detached. The detachment is recognized as such by its folded, wavy surface, grey "shot-silk" color, regularly distributed and darkened retinal vessels and a trembling motion imparted by movement of the eye. The top of a dark brown, nodular tumefaction which does not tremble when the eye is moved, is seen in front of, and below, the detachment. Transillumination of the eye from a point far back and below, casts a shadow on the pupil, while from other regions of the eye the pupil illuminates perfectly.

DIAGNOSIS: The history of this case points to sarcoma of the choroid. Development of the neoplasm was attended by slow, painless loss of vision. The abrupt blindness which ensued marks the time when detachment occurred. The diagnosis is positively confirmed by the presence of a dark, immovable tumefaction which does not transilluminate.



GLIOMA OF THE RETINA

RIGHT fundus oculi of a boy, aged two years. Apparently in good health. Family history negative. Has had no eruptive fever or severe illness. The parents recently observed a peculiar appearance of the right eye, consisting of a whitish reflex from the pupil. Eye tension normal. Media clear. No iritic adhesions. The pupil responds promptly to light. By focal illumination a deep, pinkish white reflex is obtained through the pupil. With the ophthalmoscope the lower portion of the fundus is seen to be greatly elevated. On the nasal side below is a pinkish white tumefaction, covered with blood vessels, which branch in an erratic manner and pursue anomalous courses. This mass has a firm appearance and does not tremble on movement of the eye, in fact, it presents the ophthalmoscopic picture of a neoplasm. On the temporal side and below the tumor are large, silver grey, bladder-like elevations, over which the retinal vessels pursue a normal course. This region trembles on sudden movement of the eye and, evidently, is a simple detachment of the retina. The pupil is not darkened on transillumination. The diagnosis is glioma with collateral detachment of the retina. (For differentiation of glioma from pseudoglioma, see diagnostic card No. 8.)

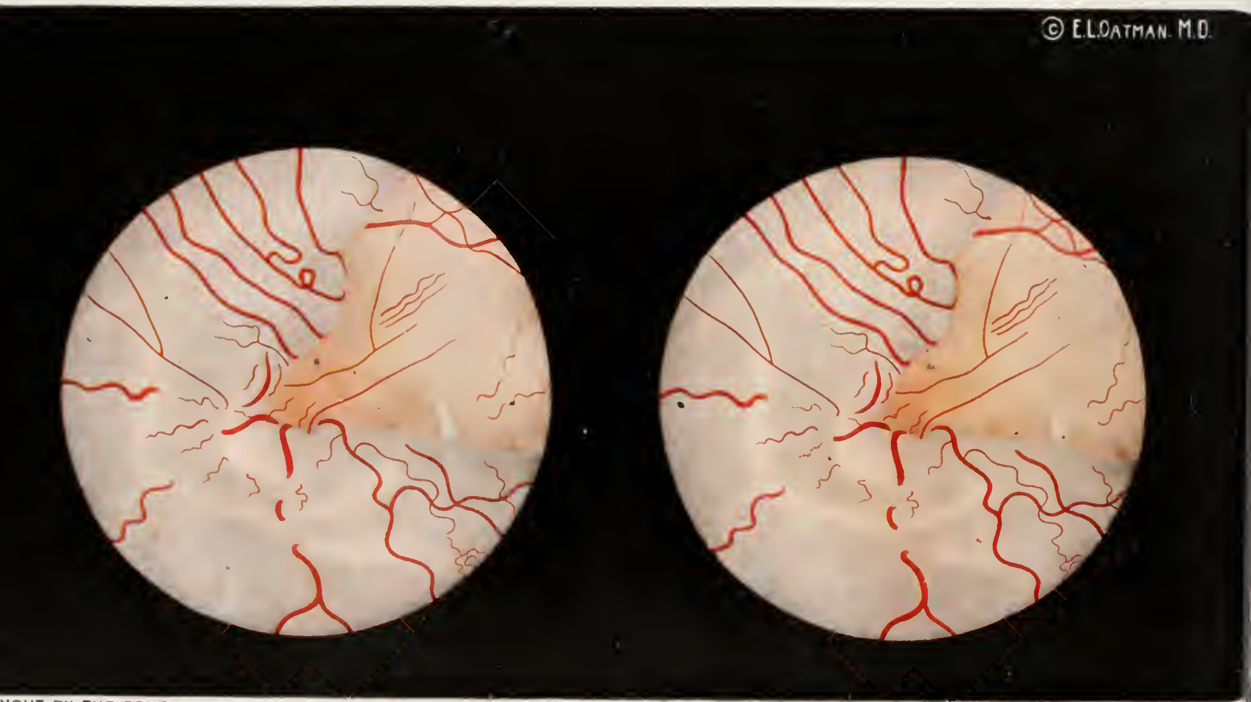


PSEUDOGLIOMA

SYNONYM: METASTATIC ENDOPHTHALMITIS

LEFT eyeground of a boy, seven years of age. His only severe illness was diphtheria, which occurred five years ago. Right eye is normal. His parents recently discovered that his left eye was blind. Since birth the left iris has been lighter in color than the right. The eye has no perception of light. The pupil reacts slowly to direct, strong light, but is abnormally sluggish to weak illumination. Consensual pupillary reaction is normal. The ophthalmoscope shows the entire fundus to be unevenly elevated. Bluish white, nodular formations cover the disc and also the inferior and nasal portions of the eyeground. The upper outer quadrant of the fundus appears as an immovable, pinkish white, flat membrane. The entire surface of the eyeground is covered with blood vessels, some of which are newly formed, but the majority, from their method of distribution, are recognized as retinal. Many of the retinal vessels pierce the nodules, a peculiarity which suggests that the latter are composed of inflammatory exudate which has covered the vessels. The flat area, extending upward and outward, is supposed to be detached retina containing less exudate than the other regions. The narrow, pointed, white formation in the lower border of the flat area is regarded as a band of new-formed connective tissue.

The diagnosis is metastatic endophthalmitis. Probably, the choroid was the seat of metastasis and the retina was fastened to the choroid by inflammatory exudates, thereby preventing the umbrella-form detachment which usually occurs in metastatic endophthalmitis. (See diagnostic card No. 8.)

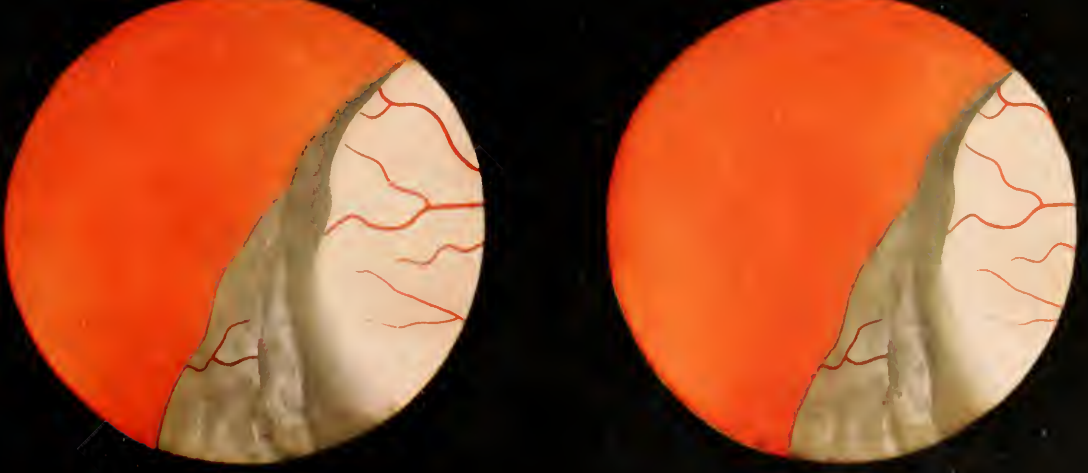


SARCOMA OF CHOROID AND CILIARY BODY

LEFT fundus oculi of a man, 28 years of age. Vision in the left eye has recently been reduced to counting fingers. No pain. Tension slightly minus. Externally, the eye is not reddened, but a single greatly dilated and tortuous anterior ciliary vein crosses the sclera on the nasal side. The ophthalmoscope reveals a very flat detachment of the retina in the macular region. At the anterior limits of the ophthalmoscopic field on the nasal side, the posterior edge of a light colored, slightly nodular tumor is seen the surface of which is traversed by blood vessels pursuing a course the reverse of that of the retinal vessels, *i. e.*, from before backward. The posterior border of the tumor merges into loose folds of detached retina. The detachment presents a dark color, owing to its position which prevents illumination by the choroidal reflex. Transillumination of the anterior nasal region corresponding to the intraocular mass, casts a shadow on the pupil. Clinical diagnosis is sarcoma of the choroid and ciliary body. The eye was enucleated and was found to contain a poorly pigmented sarcoma.

DIAGNOSIS: Conglomerate tubercle of the ciliary body may simulate sarcoma. It differs, however, in its tendency to invade all structures that lie in its path including the iris, lens and sclera. In ciliary tubercle, secondary deposits usually form in the iris and excite a low grade of plastic inflammation. In other cases conglomerate tubercle of the ciliary body may attain a large size and perforate the globe without exciting the slightest local reaction.

NOTE.—In this stereogram the tumor is situated far forward in the eye, and when it is brought into focus with the ophthalmoscope, all details in the posterior part of the fundus are lost.

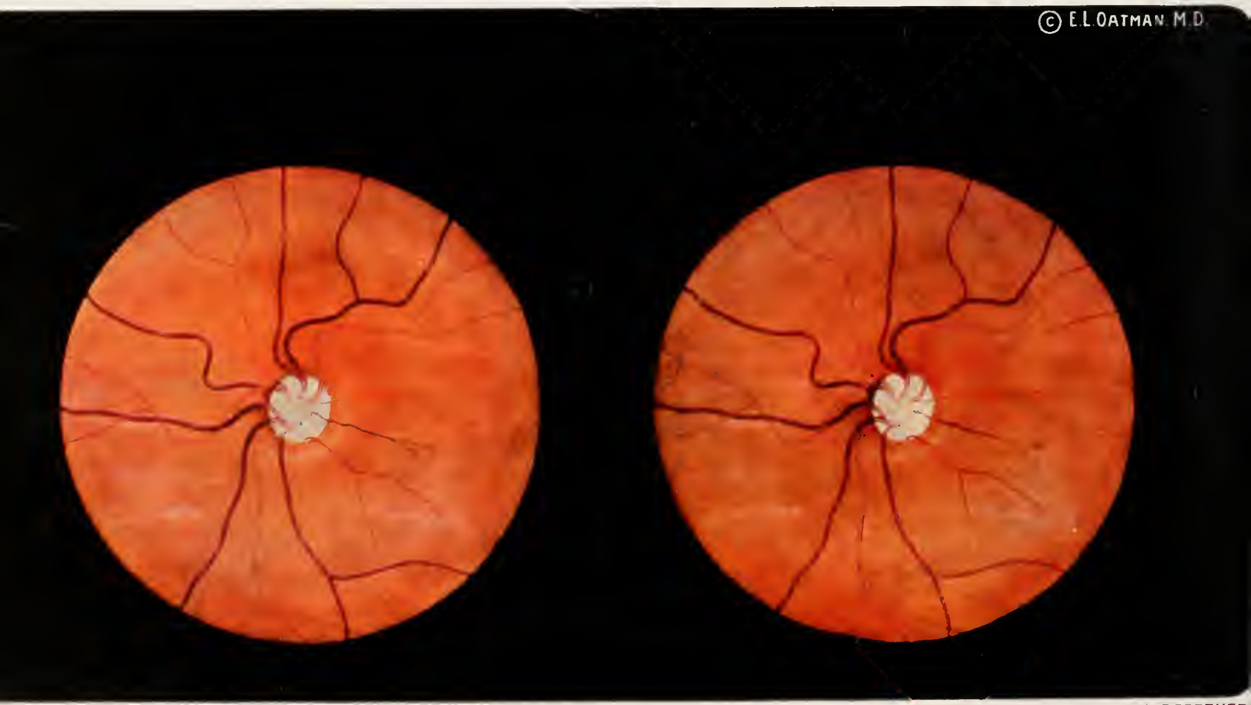


ATROPHY AND HYPEROPIA FROM TUMOR OF NERVE

LEFT eyeground of apparently healthy girl, 14 years of age. Left exophthalmus first attracted attention two months ago, at which time she had transient diplopia. At present the eye is blind. Exophthalmus is marked, the displacement being directed forward. The eye cannot be restored by pressure to its normal position. No pain. Motility is unimpaired. The cornea and media are transparent. The optic disc presents the dead white color of postneuritic atrophy. Retinal vessels appear normal. The entire posterior pole is elevated above other parts of the fundus. The center of this area has an elevation of 2 mm. (6. D.); the periphery slopes gradually away to the level of the normal fundus. The projection does not resemble detached retina but gives one the impression that the posterior walls of the globe are pushed inward. It is crossed by several horizontal light streaks, presumably caused by inequalities in the surface.

A tumor of the optic nerve was discovered and removed.

DIAGNOSIS: A tumor of the nerve produces anterior displacement of the eye; a tumor of the orbit produces lateral displacement. In nerve tumors motility of the eye is good; in orbital tumors it is defective. The eye is blind in tumor of the nerve, but some vision is retained in orbital growths; therefore, diplopia exists in the latter condition but not in tumor of the nerve except, possibly, in the early stage. Age is an important factor in differentiating these conditions, inasmuch as about 40 per cent. of intradural nerve tumors develop before the tenth year. In exophthalmus due to solid tumor the eye cannot be pushed backward into its normal position, differing in this respect from exophthalmic goitre and telangiectasis of the orbit in which the displaced eye can temporarily be reduced by pressure. The secondary hypermetropia presented by the above case is unusual in tumor of the nerve. It may occur also in tumor of the orbit.



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